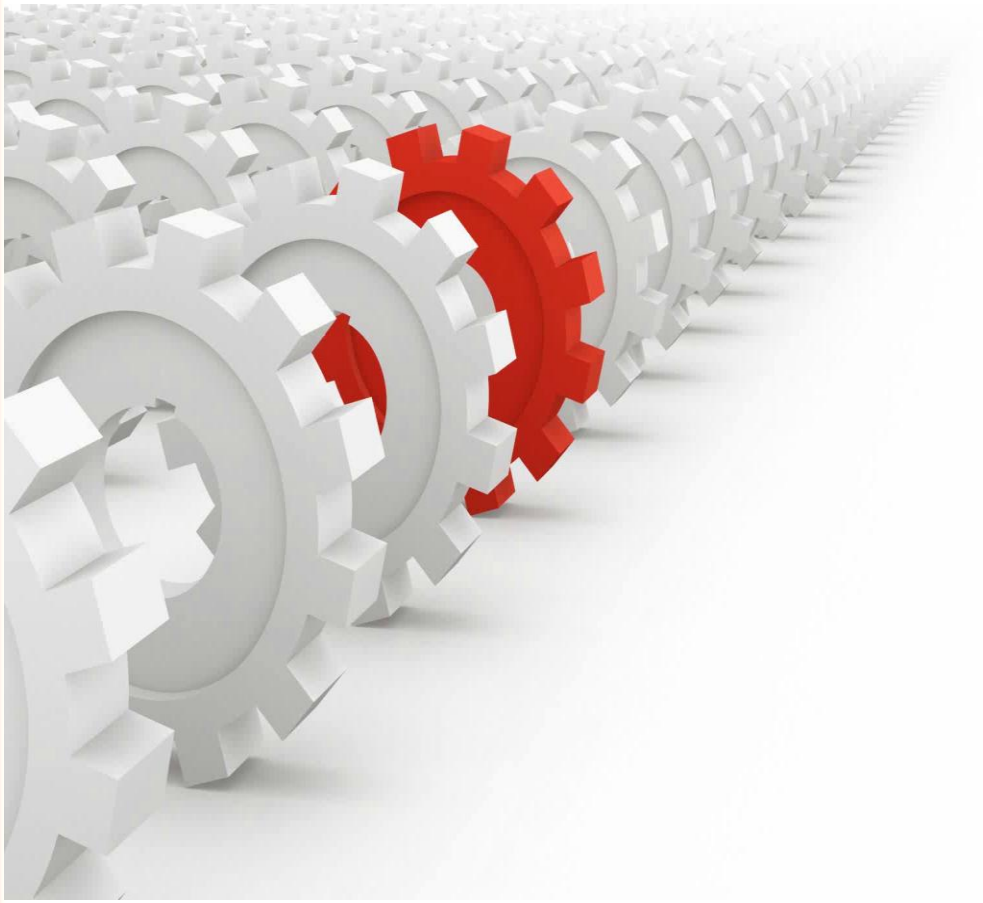

Technology transfer: trends and challenges

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March, 2014

TT: a concept in evolution

- Traditionally, technology transfer was considered a relation between firms: one possessing knowledge and IP relevant to another firm needing that knowledge
- Later industrial research opens up a new avenue: TT from the firm's lab to manufacturing (and marketing)
- Late in last century TT is considered from the perspective of universities and public research organizations
- The era of open innovation

Different approaches

- Assignment of technological intellectual property, developed and generated in one place, to another through legal means such as technology licensing or franchising (Business Dictionary).
- Process of converting scientific and technological advances into marketable goods or services (Business Dictionary)
- The term technology transfer can be defined as the process of movement of technology from one entity to another (Souder et al.1990; Ramanathan 1994). The transfer may be said to be successful if the receiving entity, the transferee, can effectively utilize the technology transferred and eventually assimilate it (Ramanathan, 1994).
- The movement may involve physical assets, know-how, and technical knowledge (Bozeman, 2000).

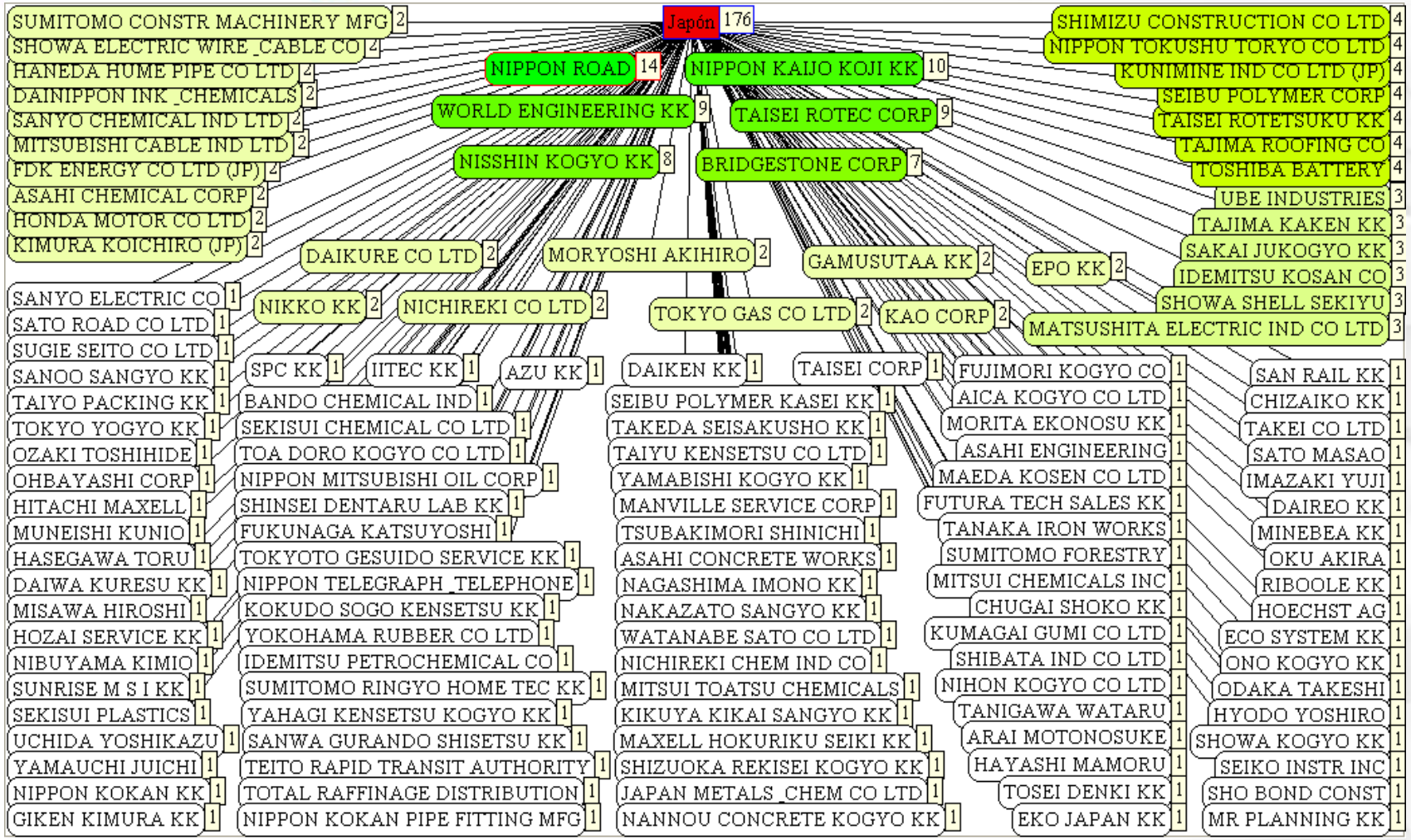
Traditional TT

- The leading role of multinationals
- Technology transfer and direct foreign investment
- The importance of life cycle
- Technology flows depend on the attractiveness of domestic market
- Must of the time technology has been transfered in the mature stage
- Developing countries made efforts to regulate TT and to avoid inadequate practices

What has changed?

- More information is available and technology selection is an important part of the process
- Competitive technological intelligence
- Benchmarking
- New ways of accessing through strategic alliances, mergers and acquisitions
- But there is still a long way to go: firms in developing countries need training (particularly SMEs)

The players


Japón 176
NIPPON ROAD 14
NIPPON KAIJO KOJI KK 10
WORLD ENGINEERING KK 9
TAISEI ROTEC CORP 9
NISSHIN KOGYO KK 8
BRIDGESTONE CORP 7
DAIKURE CO LTD 2
MORYOSHI AKIHIRO 2
GAMUSUTAA KK 2
EPO KK 2
NIKKO KK 2
NICHIREKI CO LTD 2
TOKYO GAS CO LTD 2
KAO CORP 2
SUMITOMO CONSTR MACHINERY MFG 2
SHOWA ELECTRIC WIRE _CABLE CO 2
HANEDA HUME PIPE CO LTD 2
DAINIPPON INK _CHEMICALS 2
SANYO CHEMICAL IND LTD 2
MITSUBISHI CABLE IND LTD 2
FDK ENERGY CO LTD (JP) 2
ASAHI CHEMICAL CORP 2
HONDA MOTOR CO LTD 2
KIMURA KOICHIRO (JP) 2
SHIMIZU CONSTRUCTION CO LTD 4
NIPPON TOKUSHU TORYO CO LTD 4
KUNIMINE IND CO LTD (JP) 4
SEIBU POLYMER CORP 4
TAISEI ROTETSUKU KK 4
TAJIMA ROOFING CO 4
TOSHIBA BATTERY 4
UBE INDUSTRIES 3
TAJIMA KAKEN KK 3
SAKAI JUKOGYO KK 3
IDEMITSU KOSAN CO 3
SHOWA SHELL SEKIYU 3
MATSUSHITA ELECTRIC IND CO LTD 3
SANYO ELECTRIC CO 1
SATO ROAD CO LTD 1
SUGIE SEITO CO LTD 1
SANOO SANGYO KK 1
TAIYO PACKING KK 1
TOKYO YOGYO KK 1
OZAKI TOSHIHIDE 1
OHBAYASHI CORP 1
HITACHI MAXELL 1
MUNEISHI KUNIO 1
HASEGAWA TORU 1
DAIWA KURESU KK 1
MISAWA HIROSHI 1
HOZAI SERVICE KK 1
NIBUYAMA KIMIO 1
SUNRISE M S I KK 1
SEKISUI PLASTICS 1
UCHIDA YOSHIKAZU 1
YAMAUCHI JUICHI 1
NIPPON KOKAN KK 1
GIKEN KIMURA KK 1
SPC KK 1
IITEC KK 1
AZU KK 1
BANDO CHEMICAL IND 1
SEKISUI CHEMICAL CO LTD 1
TOA DORO KOGYO CO LTD 1
NIPPON MITSUBISHI OIL CORP 1
SHINSEI DENTARU LAB KK 1
FUKUNAGA KATSUYOSHI 1
TOKYOTO GESUIDO SERVICE KK 1
NIPPON TELEGRAPH _TELEPHONE 1
KOKUDO SOGO KENSETSU KK 1
YOKOHAMA RUBBER CO LTD 1
IDEMITSU PETROCHEMICAL CO 1
SUMITOMO RINGYO HOME TEC KK 1
YAHAGI KENSETSU KOGYO KK 1
SANWA GURANDO SHISETSU KK 1
TEITO RAPID TRANSIT AUTHORITY 1
TOTAL RAFFINAGE DISTRIBUTION 1
NIPPON KOKAN PIPE FITTING MFG 1
DAIKEN KK 1
SEIBU POLYMER KASEI KK 1
TAKEDA SEISAKUSHO KK 1
TAIYU KENSETSU CO LTD 1
YAMABISHI KOGYO KK 1
MANVILLE SERVICE CORP 1
TSUBAKIMORI SHINICHI 1
ASAHI CONCRETE WORKS 1
NAGASHIMA IMONO KK 1
NAKAZATO SANGYO KK 1
WATANABE SATO CO LTD 1
NICHIREKI CHEM IND CO 1
MITSUI TOATSU CHEMICALS 1
KIKUYA KIKAI SANGYO KK 1
MAXELL HOKURIKU SEIKI KK 1
SHIZUOKA REKISEI KOGYO KK 1
JAPAN METALS _CHEM CO LTD 1
NANNOU CONCRETE KOGYO KK 1
TAISEI CORP 1
FUJIMORI KOGYO CO 1
AICA KOGYO CO LTD 1
MORITA EKONOSU KK 1
ASAHI ENGINEERING 1
MAEDA KOSEN CO LTD 1
FUTURA TECH SALES KK 1
TANAKA IRON WORKS 1
SUMITOMO FORESTRY 1
MITSUI CHEMICALS INC 1
CHUGAI SHOKO KK 1
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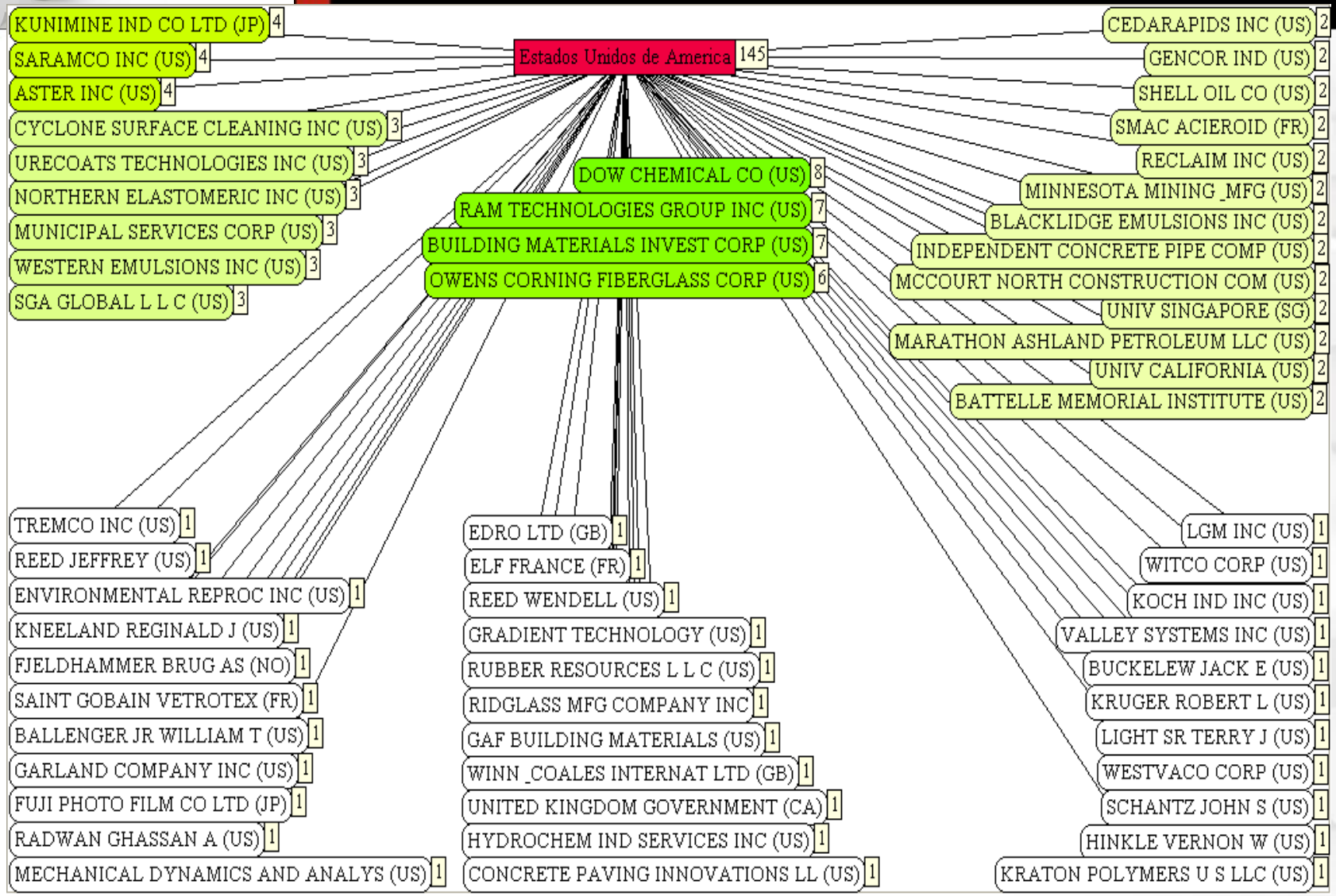
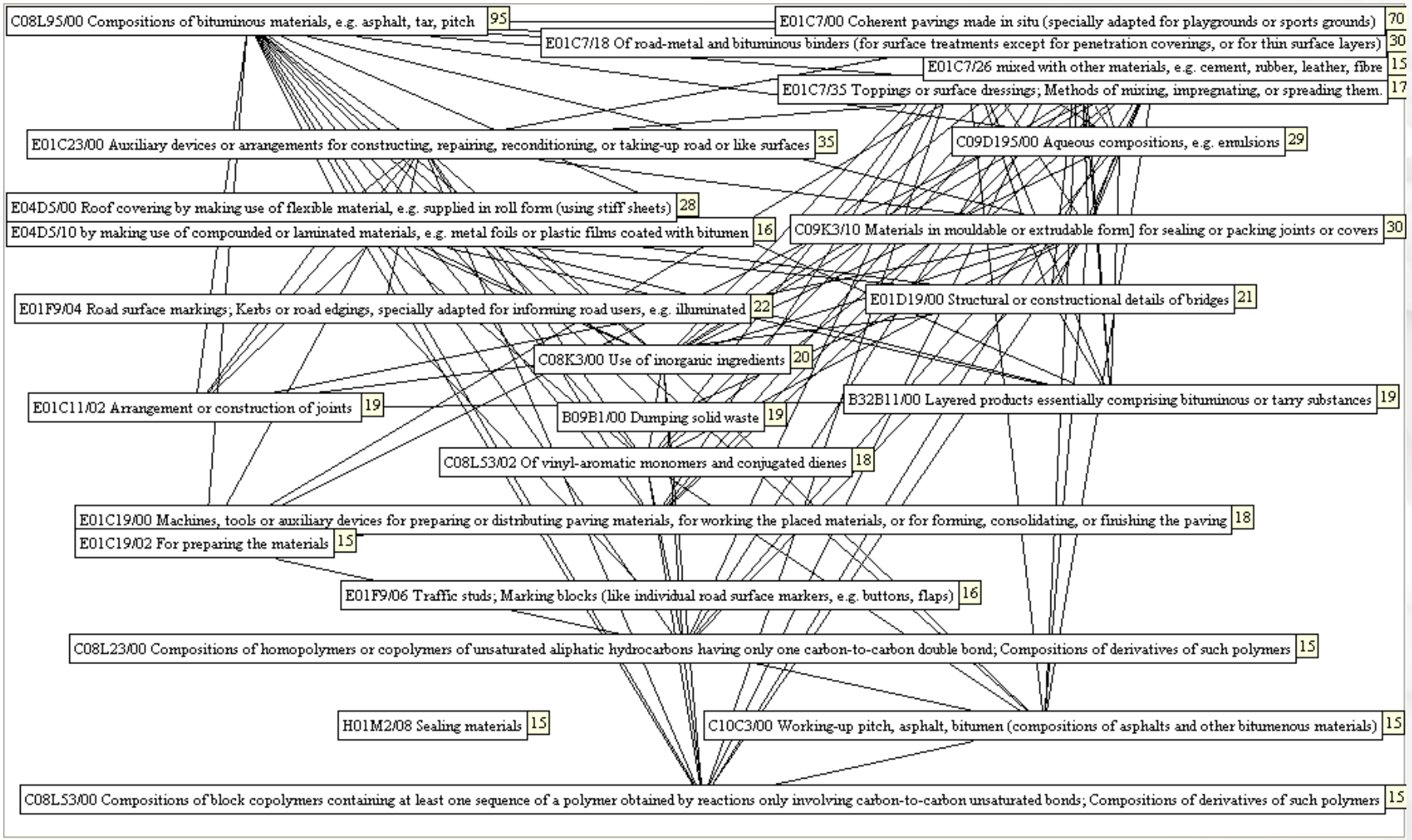
SHIBATA IND CO LTD 1
NIHON KOGYO CO LTD 1
TANIGAWA WATARU 1
ARAI MOTONOSUKE 1
HAYASHI MAMORU 1
TOSEI DENKI KK 1
EKO JAPAN KK 1
SAN RAIL KK 1
CHIZAIKO KK 1
TAKEI CO LTD 1
SATO MASAO 1
IMAZAKI YUJI 1
DAIREO KK 1
MINEBEA KK 1
OKU AKIRA 1
RIBOOLE KK 1
HOECHST AG 1
ECO SYSTEM KK 1
ONO KOGYO KK 1
ODAKA TAKESHI 1
HYODO YOSHIRO 1
SHOWA KOGYO KK 1
SEIKO INSTR INC 1
SHO BOND CONST 1
MR PLANNING KK 1

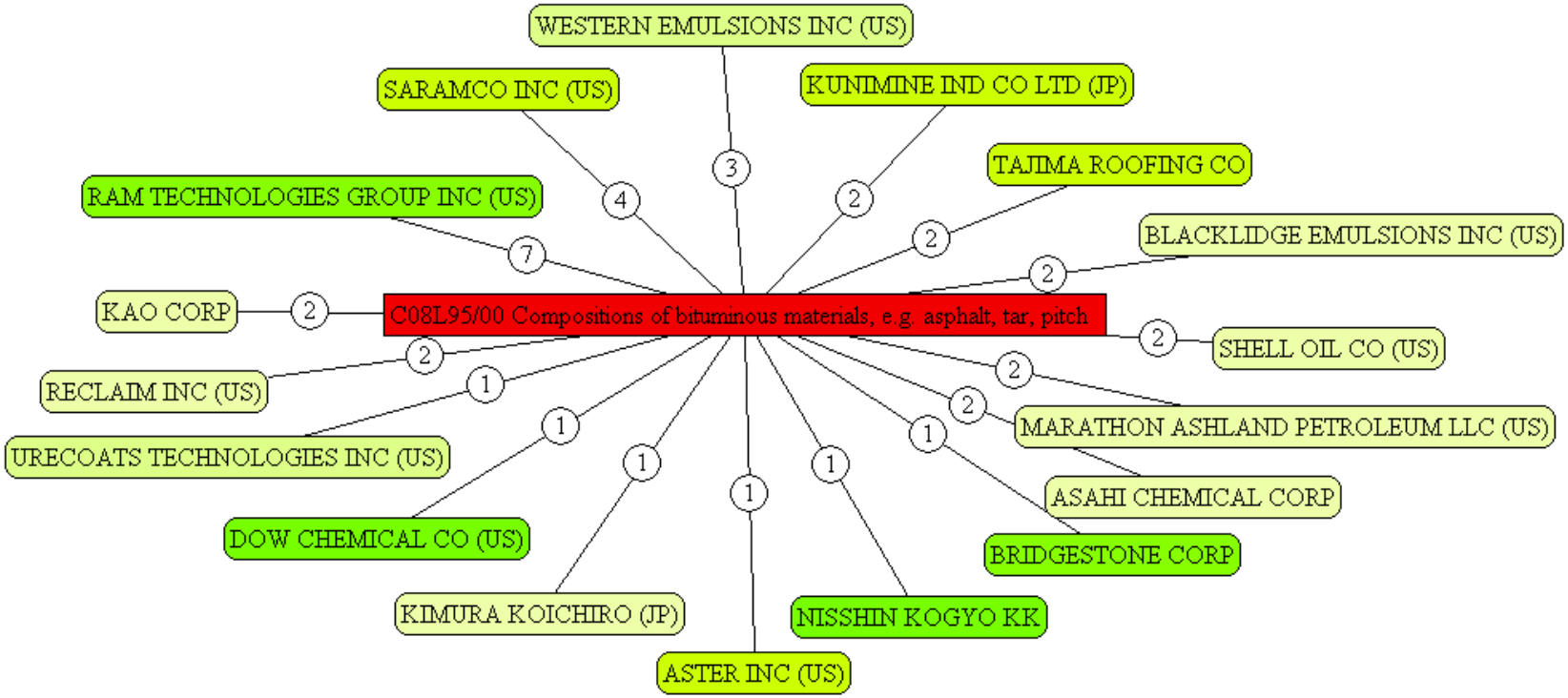
Firms owning IP in USA



Main technologies



Leaders linked to specific technology



Critical needs

- Trainng and consultancy for SMEs
- Clear definition of technological goals
- A good selection based on comprehensive analysis of available information
- Negotiation skills
- Contract preparation
- Assimilation of technology
- S&T strengths are basic to increase absorptive capacities

Internal TT

- A matter of firms with R&D capabilities
- Alignment of strategies
- Communication between R&D, Manufacturing, Marketing and Finance Departments
- Speed-up the process of innovation
- The worries about increasing costs
- Models of innovation management are useful tools

A well organized community

Industrial™ Research Institute

Creating Innovation Leadership Solutions

75 years of experience in supporting industrial R&D
Development of good practices
Research Technology Management

Effective global management and organisation of business R&D and innovation
Business model innovation
Working in globally distributed R&D

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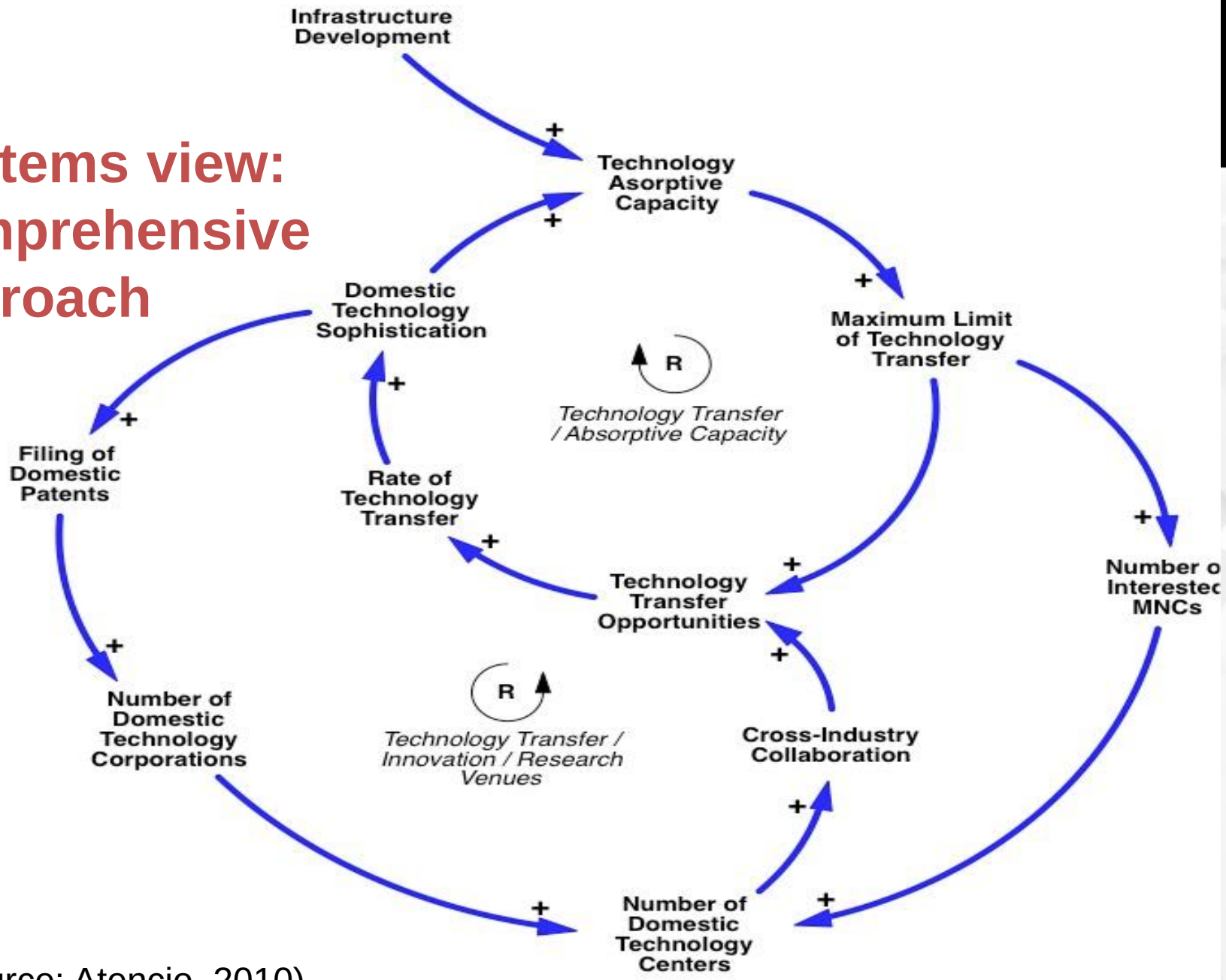
TT from universities and PROs

- Good opportunities if proper TT management is available
- Understanding the difference between research and business and the limitations of academic institutions as suppliers
- Understanding the role of IPRs
- Valorization, valuation and negotiation
- The role of Technology Transfer Offices


USERS
ACCESSIBILITY PROBLEMS
NEEDS ASSESSMENT
RESEARCH
LICENSE TECNOLOGIES
PROOF-OF-CONCEPT PROTOTYPE
PRODUCT PROTOTYPE
PRODUCT
ACCESSIBILITY SOLUTIONS
MARKETERS
UNIVERSITIES
DEVELOPERS
FUNDERS
MANUFACTURERS

Systems view: comprehensive approach



Source: Atencio, 2010)

The Three Phases of Open Innovation

1. Exploration—the parties explore the possibility of working together.
2. Joint Development—the collaboration/joint development/research agreement is written and work takes place.
3. Commercialization—a product or technology is made ready to take to market and to produce financial benefits.

	Exploration		Joint (Co-)development			Commercial
			Incubation		Development	
Contracts	**Initial Contact** Non-confidential Letter	**Detailed Discussion** Mutual, One-way or Two-way Confidentiality Agreements	**Develop Relationship** Material Transfer Agreement	**Exploratory Co-Development** Exploratory Research Agreement	**Co-Development** Detailed JDA or Alliance Agreement	**Commercial** License, Buy or Commercial Supply Agreement
Activity	Identification of Interest Areas, Business and Cultural Fit	Clear Understanding of What Each Party Brings, Technology Expertise & Areas of Interest	Initial Testing to Develop Joint Technical Statement of Work	Successful Laboratory Test & Proof of Concept	Successful Field Test & Valuation Model	Market Success for Both Firms
Deliverable	**Open Discussion**	**Agreement on Vision For Success**	**Joint Technical Plan**	**Understand Value Chain**	**Understand Valuation Thoroughly**	**Equitable Division of Profits**

OPTIONAL STEPS*

*Depending on complexity & technology development stage

Source: Mehlman et al. 2010

Better practices in open innvation (Mehlman et al. 2010)

Pre-work, Planning, Business Model and Strategy

- Defi ne, align and communicate IP, technical and business strategies.
- Clarify each partner's IP strategy.
- Use value-chain analyses to identify opportunities and to determine IP ownership.
- Select partners at different positions on the value chain to define benefi ts and mitigate risks.
- Use gap analyses and panels of experts to determine whether needed technology is available
- Defi ne whether the goal is to discover new knowledge or to commercialize.
- Choose a partner willing to see the process through to the end.
- Layer patent coverage to protect IP at multiple levels.

Actively Manage Your Intellectual Property

- Decide which patents to protect, license or abandon.
- Decide whether to own or merely use IP rights.
- Own IP rights if they cover core competencies.
- Own IP rights if transferring or excluding is important.
- Own IP rights if seeking partners for new technology.
- Minimize risk with access to IP without ownership

Better practices

Structure the Agreement and Negotiate Terms

- Involve business leaders of the respective partners.
- Involve the attorney internally, not with partner.
- Specify terms and conditions.
- Provide for transfer of trade secrets, know-how and IP.
- Decide who pays for filing and maintenance fees.
- Document actions and decisions to avoid misunderstanding.
- Negotiate IP rights and ownership as soon as outcomes can be visualized.
- Link royalty payments to milestones.
- Decide responsibility for product liability and infringement of third parties' IP..

Develop the Needed Documents

- Have a template for recurring agreement types.
- Have a generic template for routine collaborations, and customize where necessary.
- Use a mergers & acquisitions template if you are the "deep pockets" partner and want more protection.

Education and Training

- Raise the awareness of employees through training
- Train employees who will interface
- Train employees on antitrust issues in case potential joint development
- Train new employees on confidentiality and IPR
- Raise awareness with periodic newsletters.
- Foster an environment of teamwork, relationship-building and information-sharing.
- Make employees aware that IP includes trade secrets, knowhow and "show-how" as well as patentable art.

Attorney-Related Considerations

- Select a transaction-minded attorney.
- Drive the attorney by specifying goals and urgency.
- Negotiate terms business-to-business with legal support.
- Use attorneys when commercial/technical people agree in principle but cannot agree on wording.

Final remarks

- TT among firms will stay as the main flow
- Developing countries need better skills to negotiate
- Domestic S&T is the base for selection and assimilation
- Universities and PROs have to adjust their institutional frameworks to work with industry
- Open innovation is a challenge and an opportunity too

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THANK YOU