

Paradigma industrială

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Paradigma industrială (S. Jack Hu, Yoram Koren)

Productia artizanală/ Craft production

- Produse fabricate la cerere la cost scazut
- Produse fabricate la cerere la cost ridicat

Pana in 1913

Productia de masa/ Mass production

- Produse fabricate in functie de cererea agregata
- Standardizare ridicata
- Dedicated Manufacturing System

Evul mediu:

1913 – paradigma dominanta

1980

- Management stiintific (Henri Fayol, Fredrick Taylor)
- Intersanjabilitate (Eli Whitney, 1801)
- linii de asamblare (1913)
- specializarea muncii
- calitatea ? -----> costuri mari pe stocuri
- inovatia
- criza: in anii 70'

Productia de masa costumizata

- Produse fabricate in functie de cerere agregata si cerintele consumatorilor (combinatia intre marketing si manufacturare

1980

- Product Family Architecture (PFA): productie modulara (module comune + variante)
- Reconfigurable Manufacturing Systems (RMS)
 - ajustarea functionalitatii si capacitatii de productie
 - Modularitate, Integrabilitate, flexibilitate, personalizare, scalabilitate, convertibilitate si diagnoza (1999) - Yoram Koren
 - Reconfigurable machine tool
 - Capacitate, functionalitate, cost



Productia costumizata/personalizata

- Open architecture products
 - modul comun + module customizate + module personalizate;
 - platformă fixă + module care pot fi adăugate și schimbate
- Personalization design
- On-demand manufacturing systems (de ex. 3 D)

Guvernanta lantului de valoare

Gary Gereffi, John Humphrey, Timothy Sturgeon, Hubert Schmitz

Tendinte

- dezintegrarea pe verticală a corporatiilor transnationale
- concentrarea pe inovare, strategie de productie, marketing
- reducerea dreptul de proprietate directă asupra functiilor "non-core", cum ar fi serviciile generice si productia

Lantul de valoare: include toate procesele pe care le desfasoara o firma sau un grup de firme, precum proiectare, productie, comercializare, distributie si suport pentru consumatorul final

Guvernanta lantului de valoare (GVC)/ guvernanta inter-firma: „puterea care determina alocarea financiare, umane si materiale pe fiecare lant de valoare (G. Gereffi)

Cine detine GVC = corporatia key driver/”global buyer”

Key driver = fabricanți finali ai unui produs sau retaileri, ori proprietari de brand-uri și care controlează achiziția și distribuția pe un canal global de mărfuri / „buy-driven global commodity chain” și coordonează producția industrială care poate fi fragmentat în n-1 firme.

Control/prorietate:

- input-uri
- piramidal/cascada

Ce trebuie produs, cum, cat si unde

Obiective:

- Acces la piata
- Distributia veniturilor
- Influentarea canalelor de furnizare sau controlul asupra input-urilor
- Modelarea asistentei tehnice
- Controlul asupra distributiei

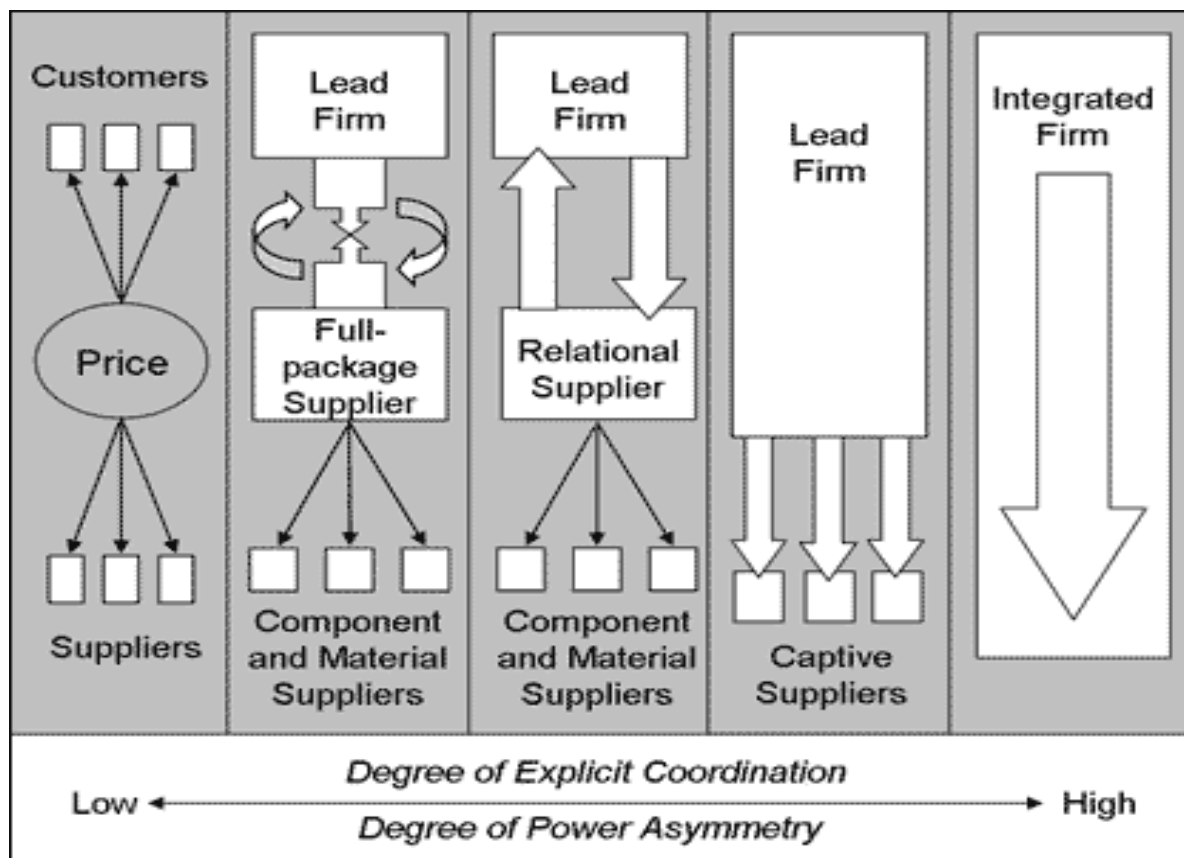
Variabilele GVC

Complexitatea tranzactiilor

Codificarea tranzactiilor

Competenta furnizorilor/producatorilor

Tipologia GVC:



Sursa: Gary Gereffi, John Humphrey, Timothy Sturgeon: The governance of global value chains, Review of International Political Economy 12:1 February 2005, pag.89

Piete/Markets:

- Tranzactiile: complexitate scazuta, codificare inalta
- Specificatiile de produs sunt simple,
- Specificitatea activelor nu se realizeaza
- Capac. de furnizare: inalta
- Lipsa de coordonare

Lanturi de valori modulare:

- Specificatiile de produs fixate de client
- Responsabilitatea productiei apartine furnizorului
- Tranzactiile sunt codificate + complexitate ridicata
- Grad de coordonare slaba

Lanturi de valori relationale:

- Complexitatea tranzactiilor: inalta
- Codificarea tranzactiilor scazuta
- Capacitati de furnizare: medie
- Grad de coordonare: mediu

Lanturi de valori captiv:

- Complexitatea tranzactiilor: inalta
- Codificarea tranzactiilor inalta
- Capacitati de furnizare: scazut
- Grad de coordonare: inalt
- Leader puternic

Ierarhia:

- Complexitatea tranzactiilor: inalta
- Codificarea tranzactiilor: scazuta
- Capacitati de furnizare: scazut
- Grad de coordonare: inalt
- Leader puternic: Integrare verticala + control managerial
- Specificatii fixate de leader

Evaluarea C-D si inovarii

- Manualul Frascati, Manualul Oslo -

Masurarea activitatii C-D/R & D

1.Manualul Frascati ((Christopher Freeman - National Innovation System, Alison Young) - 1963

Standard pentru evaluarea cercetarii si dezvoltarii experimentale
Masurarea input-urilor C-D: cheltuieli (I) si stocul de capital uman (II)
Nu masoara inovarea.

Componenta I: cheltuieli efectuate de o unitate statistica (unitatea de observatie/unitate analitica), de sectorul public si privat sau de un sector economic (clasificare industrială) + plati efectuate in contul C-D (cheltuieli directe: curente + capital, fara amortizare).

- ✚ In expresie monetara sa calculeaza la PPP si ca pondere in PIB nominal
- ✚ Se calculeaza cheltuiala bruta (facuta pe teritoriul unui stat – cea efectuata in afara statului, intr-un an)

Componenta II: ocupare +calificare (ISCO + ISCED), nr.ore/an pt. R&D

Distributia functionala:

- Cercetarea de bază (pura sau orientata): „activitatea teoretica/experimentală, pt dobandirea de noi cunostinte, fara o aplicatie specifica” (MF, pag.30)
- Cercetarea aplicată: „cercetare care permite acumularea de noi cunostinte pentru realizarea unui obiectiv specific/practic” (MF, pag.30)
- Dezvoltare experimentală: „este efortul sistematic, bazat pe un set de cunostinte existente sau dobandite prin cercetare pentru crearea/ imbunatatirea produselor, procese, sisteme, servicii” ((MF, pag.30).

Domenii: stiinte naturale, inginerie si tehnologie, stiinte medicale, stiinte agricole, stiinte, stiinte umane

Se pot folosi 136 indicatori de input, ouput si de impact

2. Manualul Oslo: evaluarea inovarii

Inovarea tehnologica (de productie sau proces)/Technological product and process innovation – TPP se refera la implementarea unor noi produse sau procese de productie, ori la imbunatatirea proceselor de productie sau a tehnologiilor incorporate in produse (Manualul Oslo).

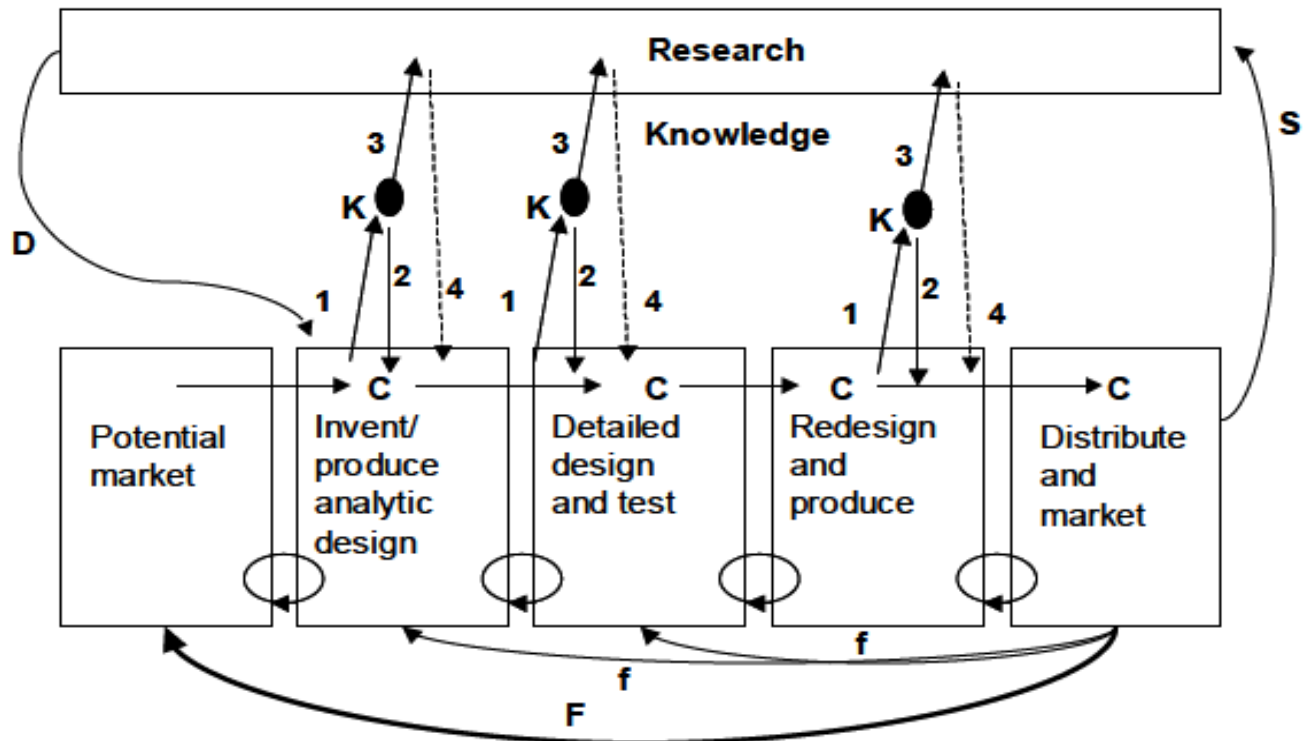
- Inovare de produs (tangibil sau intangibil): productia si introducerea in piata a unui nou produs
- Inovare de proces: introducerea unei noi tehnologii in procesul de fabricatie/metode de distributie: schimbari in echipamente, resurse umane, metode de lucru

Inovarea: toate activitatile stiintifice, tehnologice, organizatorice, financiare, și comerciale necesare pentru a crea, implementa și introduce in piata produse sau procese noi sau imbunatatite (OECD, 1997).

Componentele inovarii: R&D si dezvoltarea experimentală, pregatirea productiei (desing industrial, achizitia de tehnologie si know-how, tehnologie incorporata, productie start-up), marketing-ul pentru noi produse

Conditii:

- Performanta tehnica
- Raspunsul pietei
- Cunoastere si informatie



Source: Kline and Rosenberg, 1986.

Scop

- Evaluarea inovarii numai in sectorul firmelor cu > 10 angajati;
- Concentrarea pe produse si proces (TPP)
- Diseminarea inovarii

6 domenii de investigare:

Strategia corporativa: obiectivele inovarii intr-o companie (productie, piata, factori care ajuta/impiedica inovarea, impact, cheltuieli)

Diseminarea prin canalele de piata si non-piata

Sursele de informare pentru inovare si bariere (endogene: C-D proprii, exogene: C-D externe)

Input-urile inovarii (C-D,

Rolul politicilor publice in inovare industriala (infl. cadrul institutional)

Output-ul inovarii (procese, produse, patente ?

Nu se evalueaza inovarea organizationala, achizitia de echipamente sau soft cu aceleasi specificatii sau pentru up-gradare, diferentierea de produs

Colectarea si masurarea

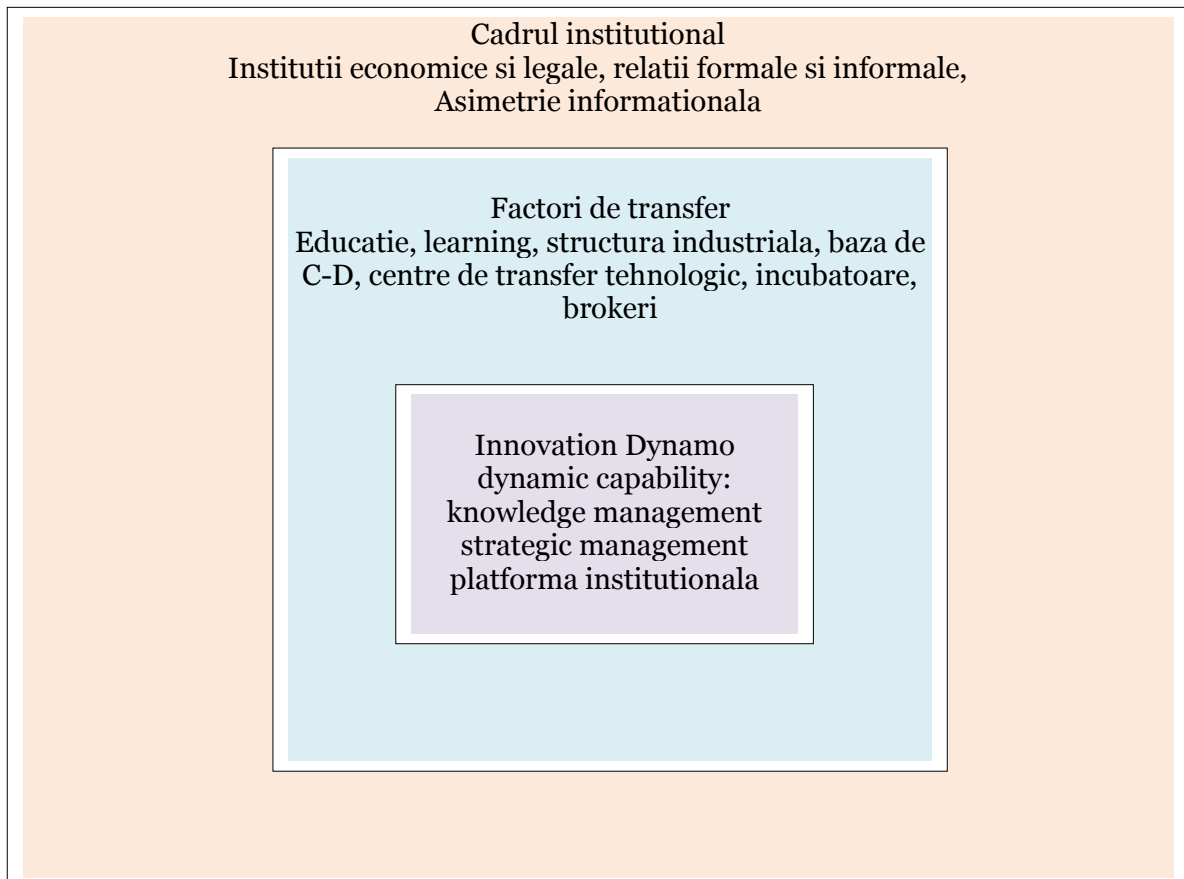
Indicatori

Chestionar care sa permita colectarea informatiilor calitative, cantitative si descriptive

Situatia Romaniei:

- innovation leaders: Danemarca, Finlanda, Germania, Suedia, UK
- innovation followers: Austria, Belgia, Cipru, Estonia, Franta, Irlanda, Luxembourg, Olanda, Slovenia
- moderate innovators: Cehia, Grecia, Ungaria, Italia, Lithuania, Malta, Polonia, Portugalia, Slovacia, Spania
- catching-up countries: Bulgaria, Letonia, Romania

Infrastructura institutionala pentru inovare: centre de dezvoltare a micilor afaceri, centre de transfer tehnologic, incubatoare de afaceri. Rolul brokerilor in inovare, mecanisme de transfer tehnologic



Scop: competitivitate si diminuarea asimetriei informationale

Transfer tehnologic: publicare, raportare/inregistrare, evaluare, obtinerea patentului, comercializare, parteneriat

Transfer orizontal: dintr-un domeniu in altul

Transfer vertical: C-D, cercetare aplicata, dezvoltare experimentală

Capacitatile dinamice ale firmei

Comercializare (rata de succes la inventii 0,3 – 5% sau 10%, la inovare 35-49% ???)

Infrastructura institutionala

- **Small business development center – SBDC**
 - planuri de afaceri, asistenta in productie, pachet financiar (finantare), asistenta in export – import, asistenta pentru recuperare in caz de dezastru, achizitii, servicii de cercetare a pietei
- **Small business development center for innovation:** + transfer tehnologic si comercializare, grant-uri C-D, proprietate intelectuala, dezvoltare de prototipuri
- **Technological transfer center:** protectia si comercializarea proprietatii intelectuale a unei unitati C-D, universitati, grant-uri/alte operatiuni financiare,
Localizare: universitati, companii
- **Incubatoare de afaceri:** suport pentru start-upuri
 - consultanta in marketing si suport in vanzari (studii de piata, vanzari, marketing, export, cautare parteneri: 20,6%), training in dezvoltare antreprenoriala (16,2%), finantare (obtinere finantare, retele de venture capital: 13,1%), servicii financiar-contabile si legale (12,5%), asistenta IT (7,7%), recrutare personal (7,7%), servicii de pre-incubare (3,3%).
- **Tech Parks:** suport pentru start-up, transfer tehnologic
- **Competitiveness and Technology Poles (CTP) sau Innovation clusters:** sistem de sprijin pentru crearea de retele de inovare, prin construirea de parteneriate care implică firme de afaceri si organizatiile de sprijin relevante (C - D, universitati, organizatii de formare profesionala)

Innovation broker: „actorul care intervine pentru a ajuta firmele sa obtina o valoare mai mare si crestere de productivitate castigand accesul la inovatii in fiecare stadiu al procesului de dezvoltare a afacerii: strat-up. Expansiune, productie, marketing” (Innovation Driven Economic Development Model, Collaborative Economics -CoEcon, 2008).

Mecanisme:

Cooperative Research and Development Agreements (CRADA)

Contract de licenta

Acord Intermediar de Parteneriat

Evaluarea pe teoria grafurilor cu aplicatii

Anexa

Indicatori:

Gross domestic expenditure on R&D (GERD):

1. Gross Domestic Expenditure on R&D -- GERD (million current PPP \$)
- 1.a. GERD (million national currency - for euro area, pre-EMU euro or EUR)
2. GERD as a percentage of GDP
3. GERD -- (million 2005 dollars -- constant prices and PPP)
- 3.a. GERD -- Compound annual growth rate (constant prices)
4. GERD per capita population (current PPP \$)
5. Estimated Civil GERD as a percentage of GDP
6. Basic research expenditure as a percentage of GDP

R&D Personnel (FTE):

7. Total researchers (FTE)
- 7.a. Total researchers -- Compound annual growth rate
8. Total researchers per thousand total employment
- 8.a. Total researchers per thousand labour force
9. Total R&D personnel (FTE)
- 9.a. Total R&D personnel -- Compound annual growth rate
10. Total R&D personnel per thousand total employment
- 10.a. Total R&D personnel per thousand labour force

GERD by source of funds:

11. Industry-financed GERD as a percentage of GDP
12. Government-financed GERD as a percentage of GDP
13. Percentage of GERD financed by industry
14. Percentage of GERD financed by government
15. Percentage of GERD financed by other national sources
16. Percentage of GERD financed by abroad

GERD by performance sectors:

17. Percentage of GERD performed by the Business Enterprise sector
18. Percentage of GERD performed by the Higher Education sector
19. Percentage of GERD performed by the Government sector
20. Percentage of GERD performed by the Private Non-Profit sector

Researchers (headcount):

21. Total researchers (headcount)
- 21.a. Women researchers (headcount)
22. Women researchers as a percentage of total researchers (based on headcount)
- 22.a. Business Enterprise Sector: Total researchers (headcount)
- 22.b. Business Enterprise Sector: Women researchers (headcount)
- 22.c. Business Enterprise Sector: Women researchers as a percentage of total researchers (based on headcount)
- 22.d. Government Sector: Total researchers (headcount)
- 22.e. Government Sector: Women researchers (headcount)

22.f. Government Sector: Women researchers as a percentage of total researchers (based on headcount)

22.g. Higher Education sector: Total researchers (headcount)

22.h. Higher Education sector: Women researchers (headcount)

22.i. Higher Education sector: Women researchers as a percentage of total researchers (based on headcount)

Business Enterprise Expenditure on R&D (BERD):

23. Business Enterprise Expenditure on R&D -- BERD (million current PPP \$)

23.a. BERD (million national currency - for euro area, pre-EMU euro or EUR)

24. BERD as a percentage of GDP

25. BERD -- (million 2005 dollars -- constant prices and PPP)

25.a. BERD -- Compound annual growth rate (constant prices)

26. BERD as a percentage of value added in industry

Business Enterprise R&D Personnel (FTE):

27. Business Enterprise researchers (FTE)

27.a. Business Enterprise researchers -- Compound annual growth rate

28. Business Enterprise researchers as a percentage of national total

29. Business Enterprise researchers per thousand employment in industry

30. Total Business Enterprise R&D personnel (FTE)

30.a. Total Business Enterprise R&D personnel -- Compound annual growth rate

31. Total Business Enterprise R&D personnel as a percentage of national total

32. Total Business Enterprise R&D personnel per thousand employment in industry

BERD by source of funds:

33. Industry-financed BERD -- (million 2005 dollars -- constant prices and PPP)

33.a. Industry-financed BERD -- Compound annual growth rate (constant prices)

34. Industry-financed BERD as a percentage of value added in industry

35. Percentage of BERD financed by industry

36. Percentage of BERD financed by government

37. Percentage of BERD financed by other national sources

38. Percentage of BERD financed by abroad

BERD performed in selected industries:

39. BERD performed in the aerospace industry (million current PPP \$)

39.a. Percentage of BERD performed in the aerospace industry

40. BERD performed in the electronic industry (million current PPP \$)

40.a. Percentage of BERD performed in the electronic industry

41. BERD performed in the office machinery and computer industry (million current PPP \$)

41.a. Percentage of BERD performed in the office machinery and computer industry

42. BERD performed in the pharmaceutical industry (million current PPP \$)

42.a. Percentage of BERD performed in the pharmaceutical industry

43. BERD performed in the instruments industry (million current PPP \$)

43.a. Percentage of BERD performed in the instruments industry

44. BERD performed in service industries (million current PPP \$)

44.a. Percentage of BERD performed in service industries

Higher Education Expenditure on R&D (HERD):

- 45. Higher Education Expenditure on R&D -- HERD (million current PPP \$)
- 45.a. HERD (million national currency - for euro area, pre-EMU euro or EUR)
- 46. HERD as a percentage of GDP
- 47. HERD (million 2005 dollars -- constant prices and PPP)
- 47.a. HERD -- Compound annual growth rate (constant prices)
- 48. Percentage of HERD financed by industry

Higher Education R&D Personnel (FTE):

- 49. Higher Education researchers (FTE)
- 49.a. Higher Education researchers -- Compound annual growth rate
- 50. Higher Education researchers as a percentage of national total
- 51. Higher Education Total R&D personnel (FTE)
- 51.a. Higher Education Total R&D personnel -- Compound annual growth rate

Government Expenditure on R&D:

- 52. Government Intramural Expenditure on R&D -- GOVERD (million current PPP \$)
- 52.a. GOVERD (million national currency - for euro area, pre-EMU euro or EUR)
- 53. GOVERD as a percentage of GDP
- 54. GOVERD (million 2005 dollars -- constant prices and PPP)
- 54.a. GOVERD -- Compound annual growth rate (constant prices)
- 55. Percentage of GOVERD financed by industry

Government R&D Personnel (FTE):

- 56. Government researchers (FTE)
- 56.a. Government researchers -- Compound annual growth rate
- 57. Government researchers as a percentage of national total
- 58. Government Total R&D personnel (FTE)
- 58.a. Government Total R&D personnel -- Compound annual growth rate

Government Budget Appropriations or Outlays for R&D by socio-economic objectives (GBAORD):

- 59. Total Government Budget Appropriations or Outlays for R&D -- GBAORD (million current PPP \$)
- 59.a. Total GBAORD (million national currency - for euro area: pre-EMU euro or EUR)
- 60. Defence Budget R&D as a percentage of Total GBAORD
- 61. Civil Budget R&D as a percentage of Total GBAORD
- 62.a.1. Civil GBAORD for Economic Development programmes (million current PPP \$)
- 62.a.2. Economic Development programmes as a percentage of Civil GBAORD
- 62.b.1. Civil GBAORD for Health and Environment programmes (million current PPP \$)
- 62.b.2. Health and Environment programmes as a percentage of Civil GBAORD
- 62.c.1. Civil GBAORD for Education and society (million current PPP \$)
- 62.c.2. Education and Society as a percentage of Civil GBAORD
- 62.d.1. Civil GBAORD for Space programmes (million current PPP \$)
- 62.d.2. Space programmes as a percentage of Civil GBAORD

- 62.e.1. Civil GBAORD for Non-oriented Research programmes (million current PPP \$)
- 62.e.2. Non-oriented Research programmes as a percentage of Civil GBAORD
- 62.f.1. Civil GBAORD for General University Funds (GUF) (million current PPP \$)
- 62.f.2. General University Funds (GUF) as a percentage of Civil GBAORD

R&D Expenditure of Foreign Affiliates:

- 63. R&D expenditure of foreign affiliates (million current PPP \$)
- 63.a. R&D expenditure of foreign affiliates (million national currency - for euro area, pre-EMU euro or EUR)
- 64. R&D expenditure of foreign affiliates as a percentage of R&D expenditure of enterprises

Patents:

- 65. Number of triadic patent families (priority year)
- 65.a. Number of patent applications to the PCT (priority year)
- 66. Share of countries in triadic patent families (priority year)
- 67. Number of patents in the ICT sector - applications filed under the PCT (priority year)
- 68. Number of patents in the biotechnology sector - applications filed under the PCT - (priority year)

Technology Balance of Payments (TBP):

- 69. Technology balance of payments: Receipts (million current dollars)
- 69.a. Technology balance of payments: Receipts (million national currency - for euro area, pre-EMU euro or EUR)
- 70. Technology balance of payments: Payments (million current dollars)
- 70.a. Technology balance of payments: Payments (million national currency - for euro area, pre-EMU euro or EUR)
- 71. Technology balance of payments: Payments as a percentage of GERD

International trade in R&D-intensive industries:

- 72. Export market share: Aerospace industry
- 72.a. Total imports: Aerospace industry (million current dollars)
- 72.b. Total exports: Aerospace industry (million current dollars)
- 73. Export market share: Electronic industry
- 73.a. Total imports: Electronic industry (million current dollars)
- 73.b. Total exports: Electronic industry (million current dollars)
- 74. Export market share: Office machinery and computer industry
- 74.a. Total imports: Office machinery and computer industry (million current dollars)
- 74.b. Total exports: Office machinery and computer industry (million current dollars)
- 75. Export market share: Pharmaceutical industry
- 75.a. Total imports: Pharmaceutical industry (million current dollars)
- 75.b. Total exports: Pharmaceutical industry (million current dollars)
- 76. Export market share: Instruments industry
- 76.a. Total imports: Instruments industry (million current dollars)
- 76.b. Total exports: Instruments industry (million current dollars)