Innovation

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Business Management in the CR

What is innovation

- Schumpeterian innovation
- **innovation vs. imitation**
- Innovation according OECD (Oslo Manual)
  - Product and process innovation (should be in balance)
  - Organizational innovation
  - Marketing innovation
- New combination of existing production factors (Schumpeter)

What is innovation

Innovation is

- the renewal and enlargement of the range of products and services and the associated markets;
- the establishment of new methods of production, supply and distribution;
- the introduction of changes in management, work organization, and the working conditions and skills of the workforce. (*European Commission definition*)
- **Invention vs. Innovation,**

Innovation levels according Valenta

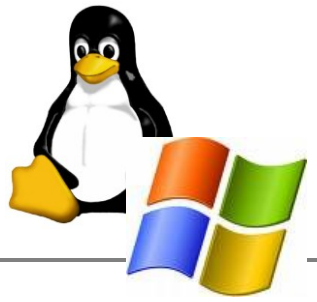
Řád inovace *Innovation level*	Označení *Nomenclature*	Co se zachovává *What remains?*	Co se mění *What changes?*	Příklad *Example*
minus N	degenerace *degeneration*	---	úbytek vlastností *decrease of features*	opotřebení *depreciation*
0	regenerace *regeneration*	objekt *object*	obnova vlastností *recovery of features*	údržba, opravy *servicing, repairs*
RECIONALIZACE / *RATIONALIZATION*				
1	změna kvanta *quantity*	všechny vlastnosti *all features*	četnost faktorů *quantity of factors*	další pracovní síly *additional manpower*
2	intenzita *intensity*	kvality a propojení *qualities and interconnections*	rychlost operací *speed of operation*	zvýšený posun pásu *faster conveyor*
3	reorganizace *reorganization*	kvalitativní vlastnosti *qualitative features*	dělba činností *distribution of operations*	přesuny operací *operation swapping*
4	kvalitativní adaptace	kvalita pro uživatele *quality for customer*	vazba na jiné factory *ties to other factors*	technolog. konstrukce *technolog. design*
KVALITATIVNÍ INOVACE / *QUALITATIVE INNOVATION*				
5	varianta *variant*	konstrukční řešení *design resolution*	dílčí kvalita *partial quality*	rychlejší stroj *faster machine*
6	generace *generation*	konstrukční koncepce *design conception*	konstrukční řešení *design resolution*	stroj s elektronikou *machine with electronics*
7	druh *kind*	princip technologie *technology principle*	konstrukční koncepce *design conception*	tryskový stav *jet loom*
8	rod *family*	příslušnost ke kmeni *appropriate tribe*	princip technologie *technology principle*	netkaná textilie *non-woven textiles*
TECHNOLOGICKÝ PŘEVRAT / *TECHNOLOGICAL REVOLUTION*				
9	kmen *tribe*	---	přístup k přírodě *approach to nature*	genová manipulace *gene manipulation*

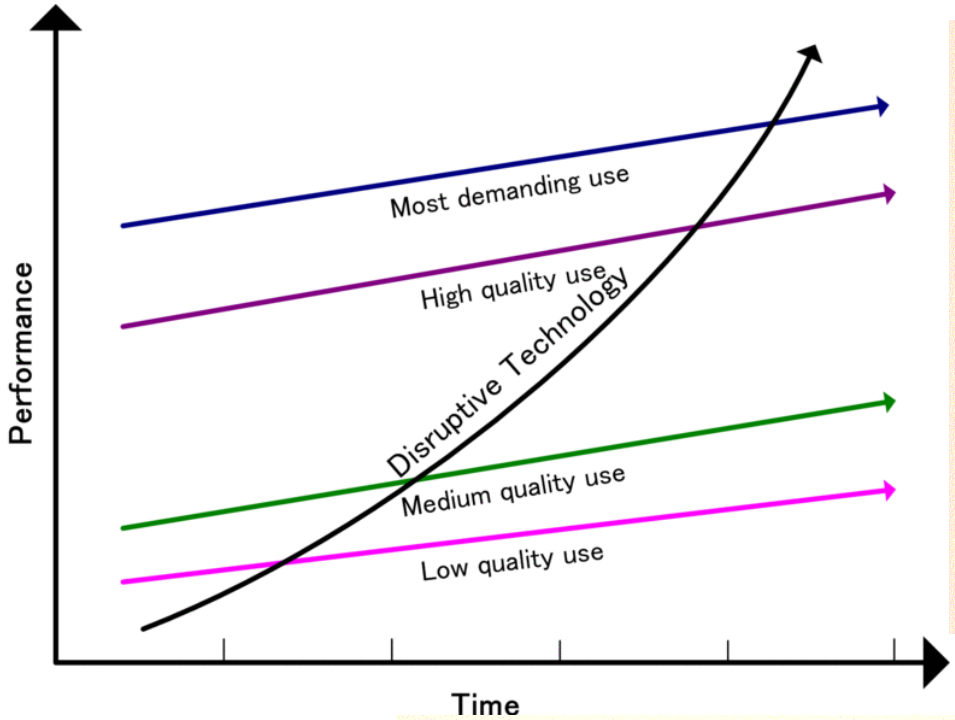
Types of innovation

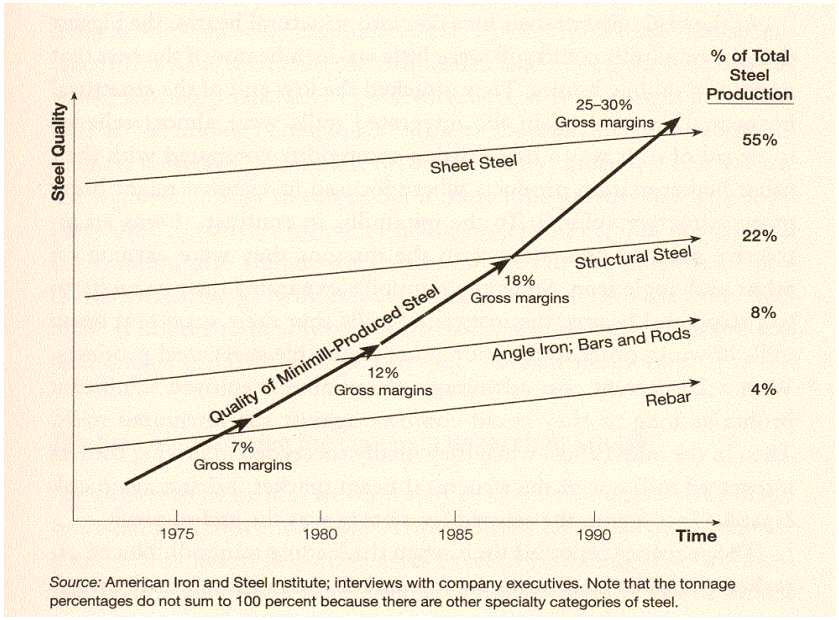
- Object of innovation:
  - Product innovation
  - Process innovation
  - Marketing innovation
  - Organizational innovation

Defined by Oslo Manual

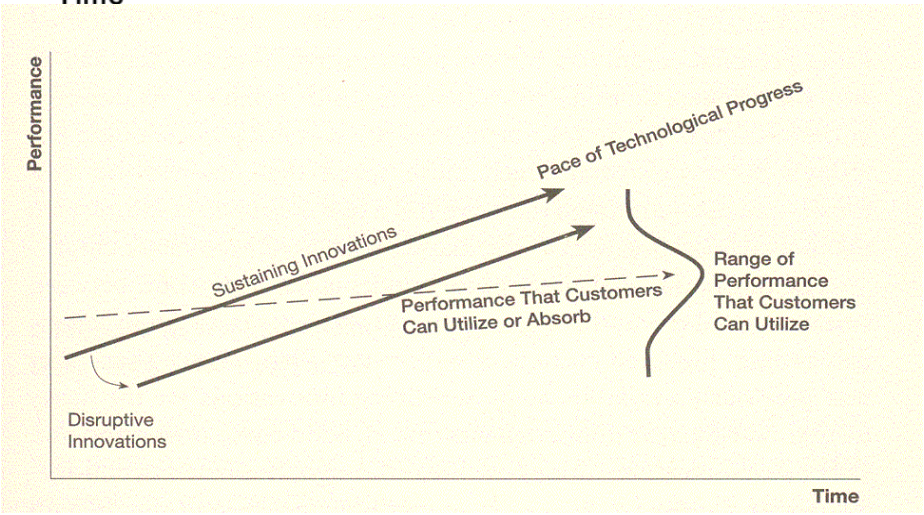
- Radicality of innovation
  - Radical innovation
  - Incremental innovation
- Christensen innovation – according impact on existing market
  - disruptive
  - sustaining







Source: American Iron and Steel Institute; interviews with company executives. Note that the tonnage percentages do not sum to 100 percent because there are other specialty categories of steel.



Open innovation

Linear Model of Innovation

Original model of three phases of the process of Technological Change

x

Open Innovation, User innovation concepts

Enteprises cooperating on innovation (in %)

	FI	SE	DK	FR	NL	**CZ**	BE	IE	UK	AT	DE
Celkem	44,4	42,8	42,8	39,5	39,4	**38,4**	35,7	32,3	30,6	17,4	16,0
Malé	38,5	38,4	39,3	35,2	33,1	**30,4**	28,6	25,2	29,4	13,7	12,5
Střední	49,1	49,6	45,7	43,3	48,9	**45,6**	48,2	45,1	31,3	19,7	16,1
Velké	73,8	68,8	69,4	60,0	67,0	**66,6**	73,3	54,0	42,6	49,1	41,0

Pramen: EUROSTAT – New Cronos, Science and Technology, CIS4 (k 21. 11. 2007).

Sources of innovation

- Internal
  - Own research and development
  - Technical departments – projection, technology, construction
  - production
  - Marketing and selling
  - Logistics (purchasing and supply)
  - Servicing
  - Owners
- External
  - Customers
  - Suppliers
  - Competition
  - Consultants
  - Universities and other research institution
  - Expert publication
  - Internet
  - Exhibitions
  - Investors
  - …..

Sources of innovation

Most valuable cooperations when innovating in the CR (in %)

Tabulka 9: Nejhodnotnější spolupráce (v % inovujících firem)

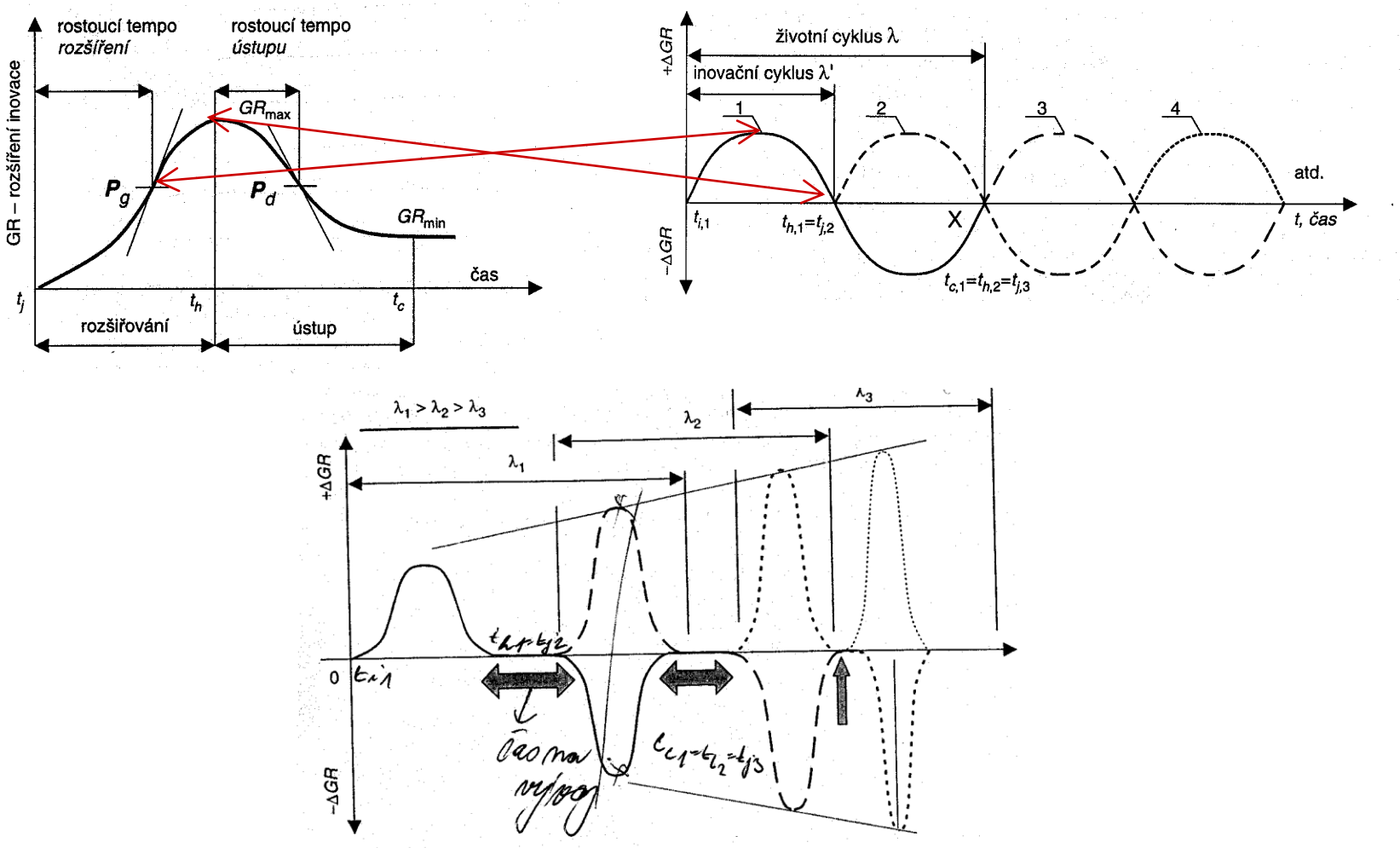
	BE	CZ	DK	DE	IE	ES	FR	LU	HU	NL	SE
Companies within industry	9,7	**6,6**	2,6	1,1	6,6	2,6	9,6	8,8	5,8	8,9	6,2
Suppliers	10,3	**12,8**	6,0	1,5	7,7	6,7	12,1	10,8	13,8	14,7	17,2
Customers	8,3	**12,1**	5,4	3,1	10,3	1,6	6,9	5,5	7,3	8,5	11,6
Competitors	1,7	**1,5**	1,0	1,0	0,2	1,4	3,6	1,4	2,9	1,3	1,2
Private RD institutions	2,5	**2,6**	1,5	0,5	2,3	1,6	3,2	1,8	2,5	2,7	3,5
Universities	2,3	**2,0**	1,5	2,0	1,8	2,0	2,2	1,1	3,8	1,4	2,5
Public RD institutions	0,5	**0,7**	..	0,8	0,6	2,3	1,9	1,0	0,7	1,9	0,5

Pramen: EUROSTAT – New Cronos, Science and Technology (k 21. 11. 2007).

Barriers of innovation

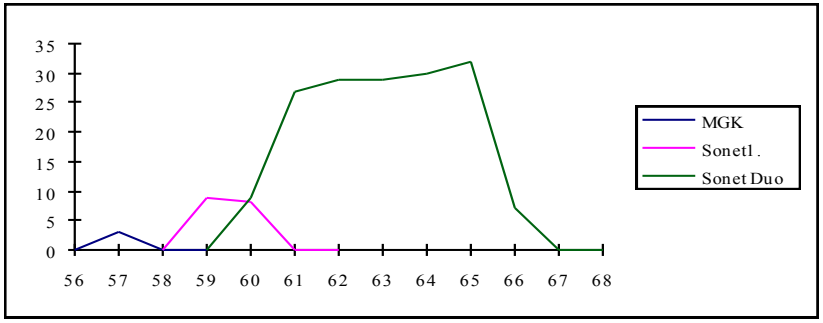
- Motivational
- Communication
- Economical
- Technological
- Personal
- Organizational
- Ecological

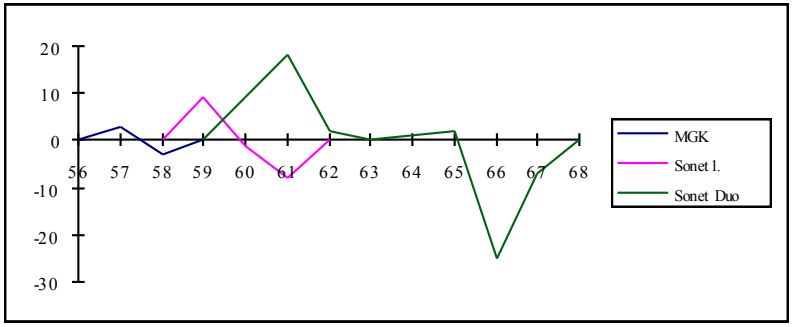
Life cycle of innovation



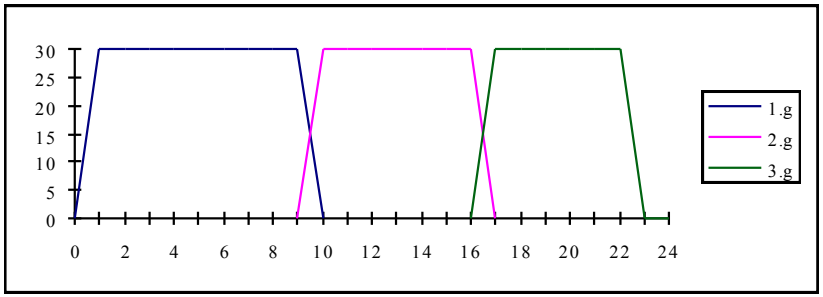
Innovation formation and difussion

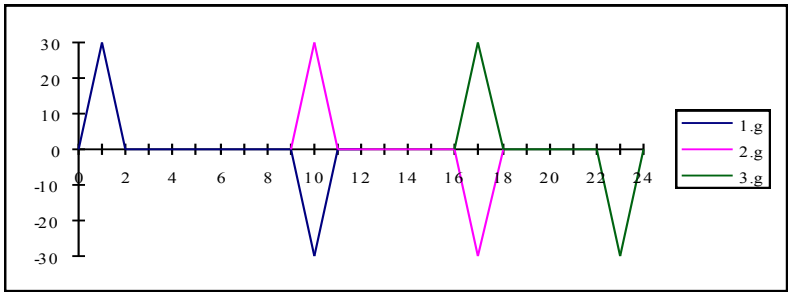
1. **Diffusion and withdrawal of first unsuccessful innovation**



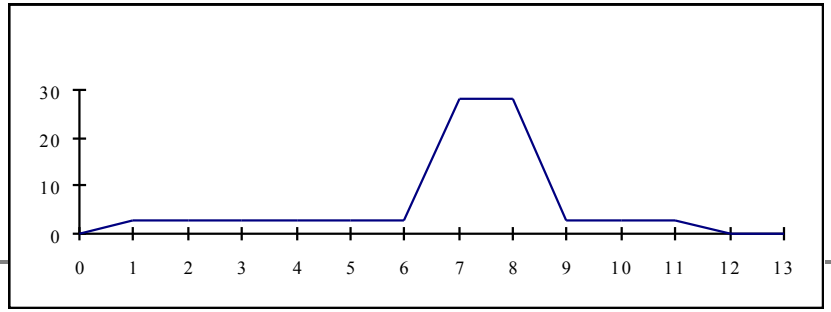


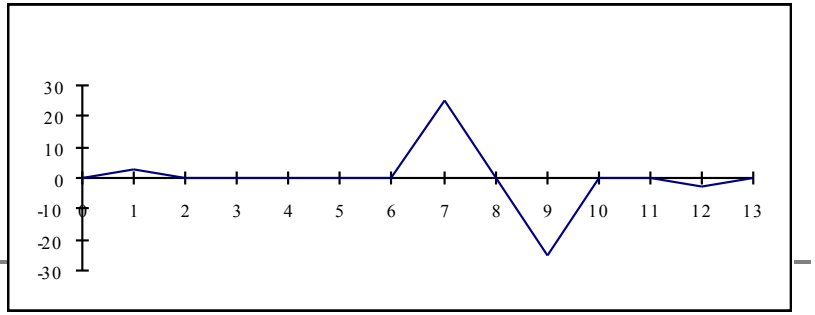
2. **Quick accession of new product, maximization of performance and quick withdrawal**



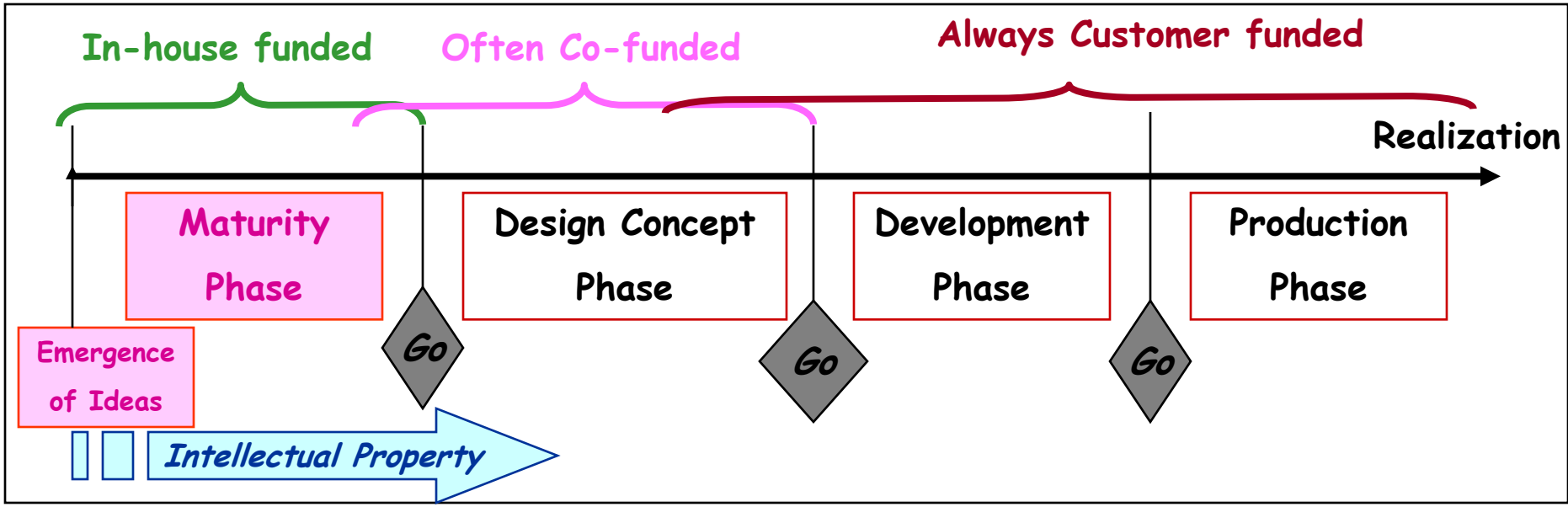


3. **Late accession to product (performance) maximum followed by quick withdrawal**





Innovation process in general



The maturity phase is always difficult to border since the activity will target a feasibility documentation as a customer project presentation.

Innovation process in the CR

•Excellence centres, Business incubators, Research and science parks, universities

•Industrial Property Office

•Grant agency (primary research)

•Ministries (applied research) – especially MIT, MEYS

•Innovative firms – they can be found in the Technological Profile of the Czech Republic database (operated by the AIP CR)

•Czech Trade

•Czech Export Bank

•Export Guarantee and Insurance corporation

•Czech Confederation of Commerce and Tourism

Czech national innovation system

- ***National Policy of Research, Development and Innovation in the Czech Republic for 2009–2015 appoved by the governmental resolution no. 729***

- No legally defined institution responsible for innovation that prepares and implements innovation policy.
- MIT, MRD, ME

- **Innovation governance system:**
- Governmental bodies: The Ministry of Education, Youth and Sports (MEYS), The Research and Development Council (R&D Council), The Ministry of Industry and Trade (MIT) . National Economic Council (NEC) , **Technology Agency of the Czech Republic .**
- Bodies responsible for implementation of policies: CzechInvest , Czech-Moravian Guarantee and Development Bank , Czech Science Foundation , The Technology Centre of the Academy of Sciences of the Czech Republic , The Association of Innovation Entrepreneurship of the Czech Republic , The Czech Chamber of Commerce

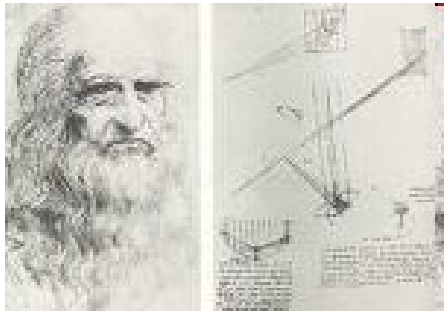
Czech national innovation system

- lack of cooperation between the research sector and the business sector;
- lack of human resources for innovation;
- inefficiency in use of public resources for R&D and innovation.

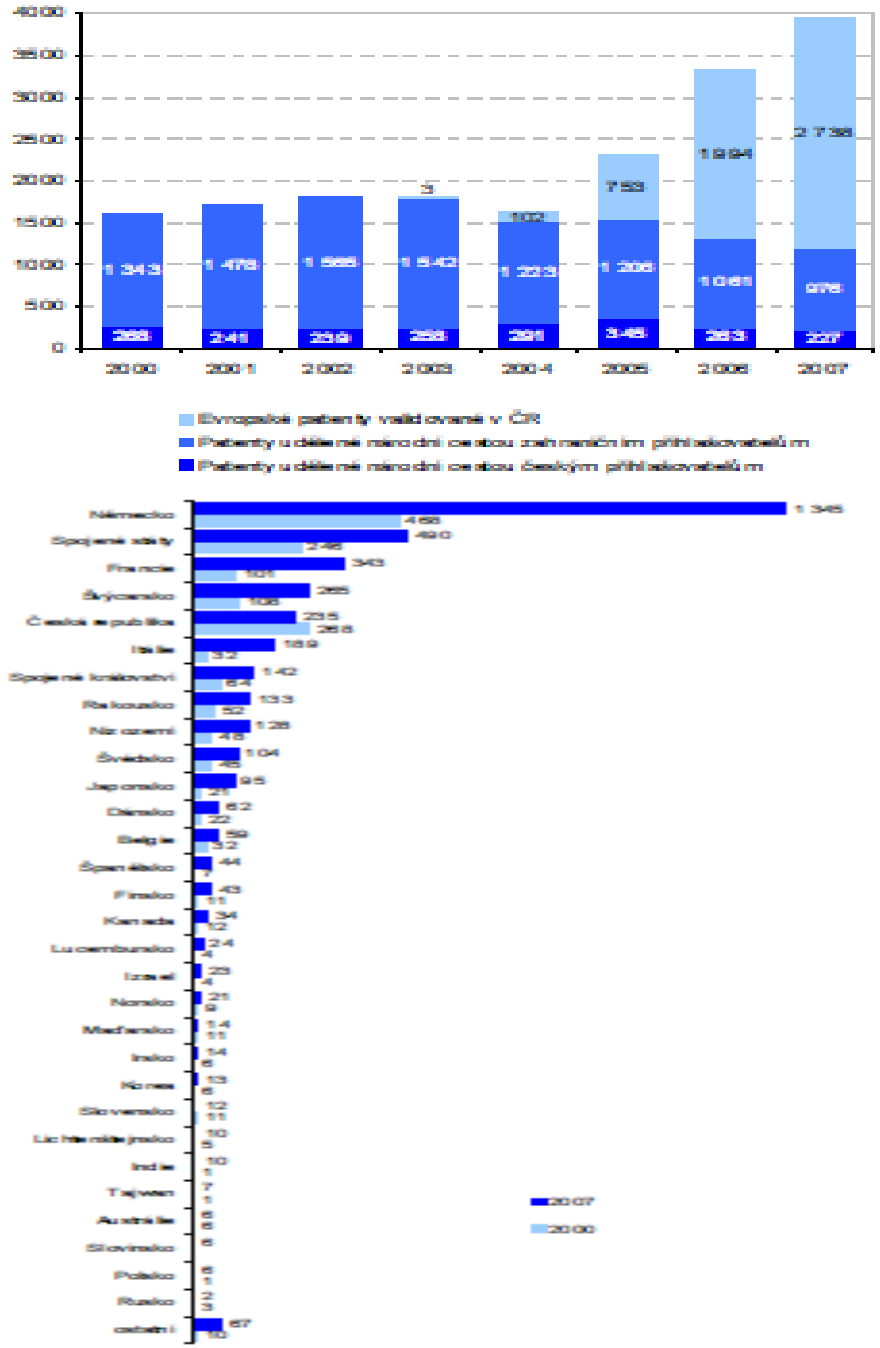
- governmental expenditures on R&D have been growing in the Czech Republic faster than in other European countries, their relative amount is still below the EU average (0.55 % GDP in the Czech Republic compared to 0.65 % in the EU-27).
- The intensity of innovation (share of expenditure on innovation in the overall turnover of innovation companies) has significantly increased in the Czech Republic over the past few years and at present (with 2.4 %), it has reached the average intensity of innovation in the EU.
- Business expenditures on R&D have been growing in the recent years in the Czech Republic. However, with 1 % of the GDP they still reach neither the level of advanced EU-15 countries nor the level desired by Lisbon strategy (Barcelona targets).

Intelectual property rights

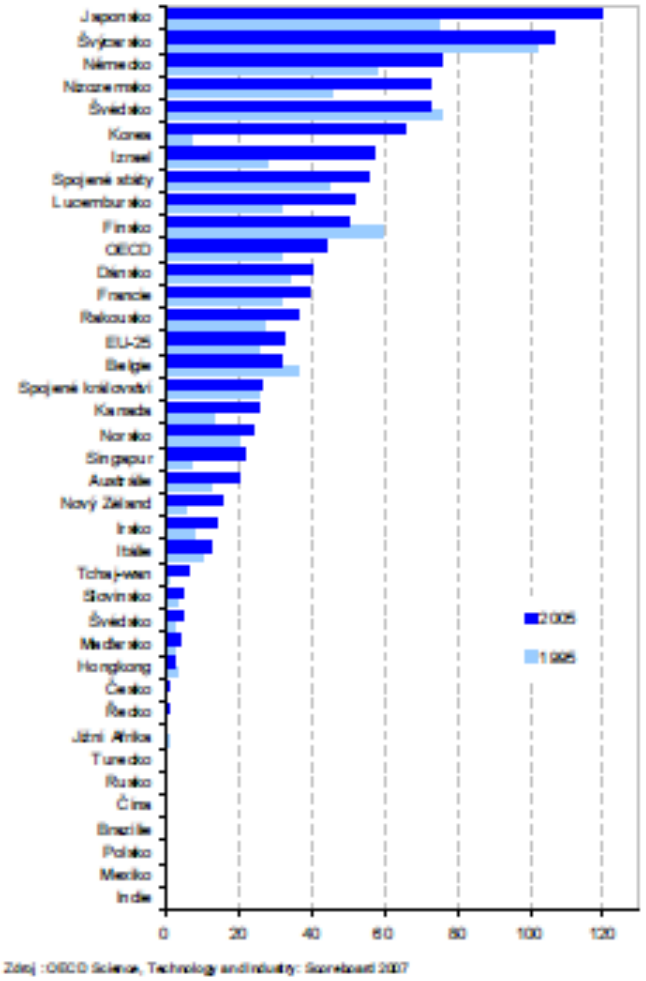
- Industrial property office
- Patents
- Utility models
- Trademarks
- Industrial designs
- Geographical indications and appeallations of origins



Number of patents granted in the CR



Number of patent triads per 1mil. Inhabitants (EPO, JPO, USPTO)

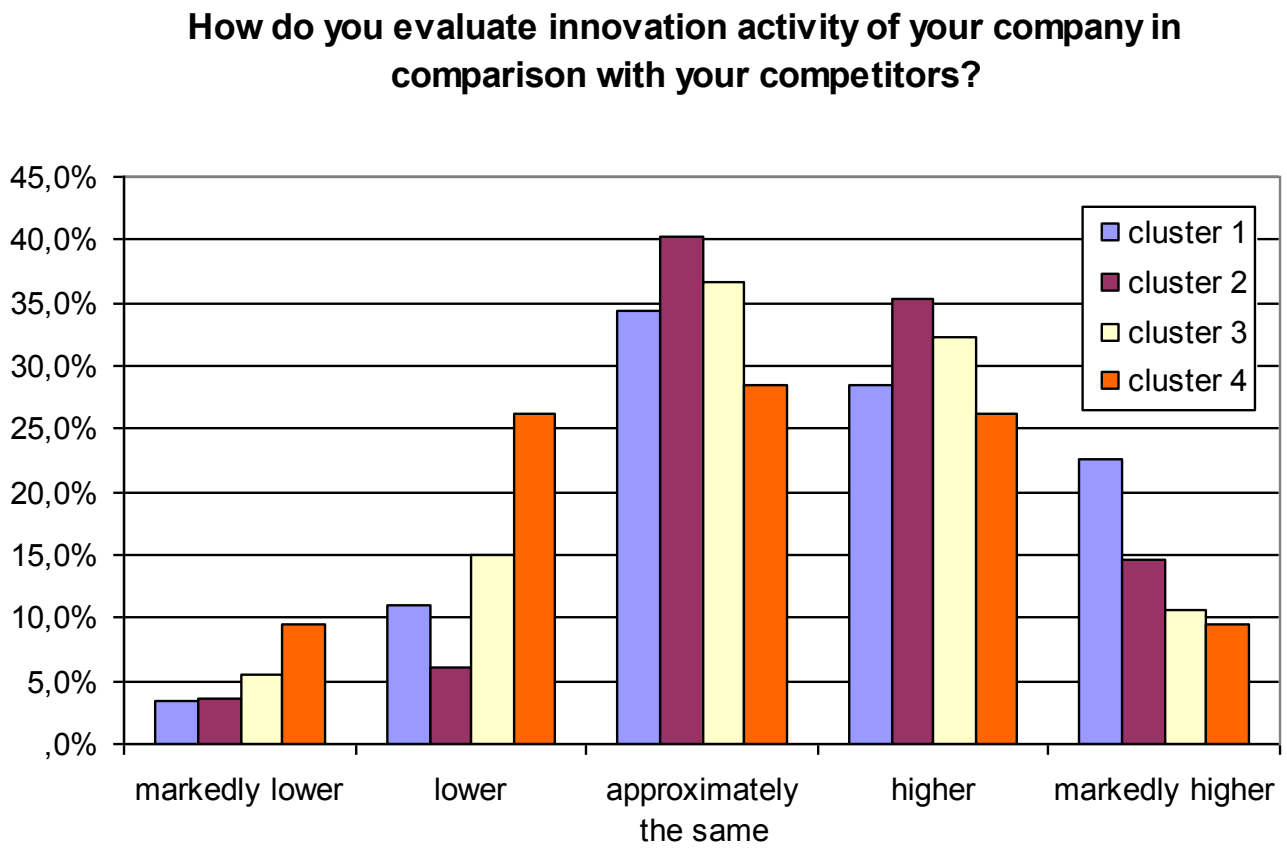


Number of patents granted in the CR according the county of an applicant

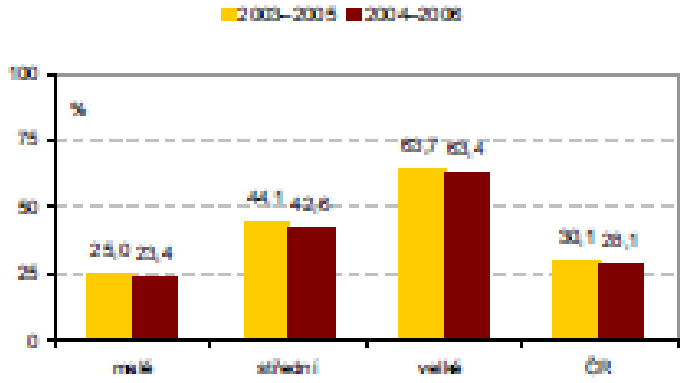
Why are innovations important (academic researches) and factors influencing them?

- Increase in customer value, starting the growth
- Relationship between country employment and radicalism of the innovation
- Traditional companies which have survived, are those employing qualified personnel, being less bureaucratic, investing more in flexible production
- Decentralized companies within uncertain environment were more innovative than centralized one (Russel 1990)
- Innovative industrial companies = higher level of formalization x innovative service companies = lower level of formalization (Damanpour 2007)
- successful innovation is normally a source of temporary market power, eroding the profits and position of old firms, yet ultimately succumbing to the pressure of new inventions commercialised by competing entrants.

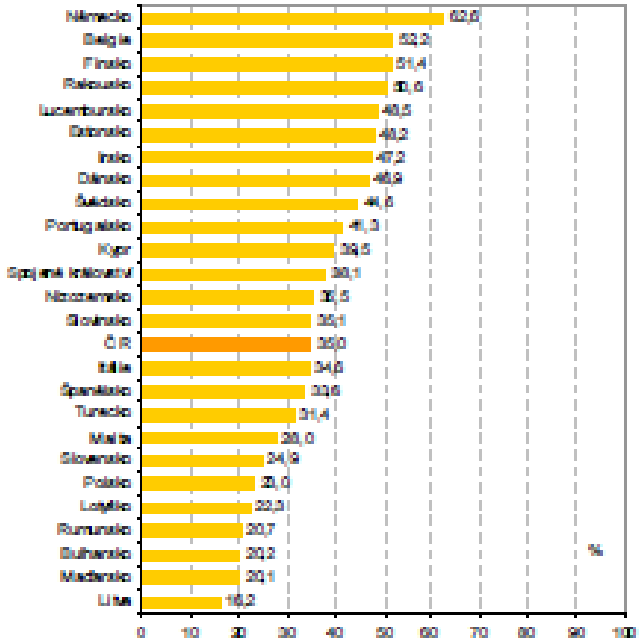
Importance of the innovation in the CR



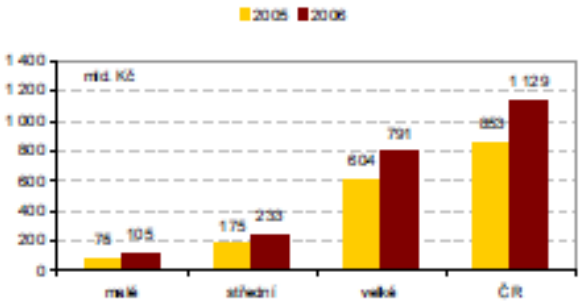
Share of innovative enterprises in the CR according size of the company



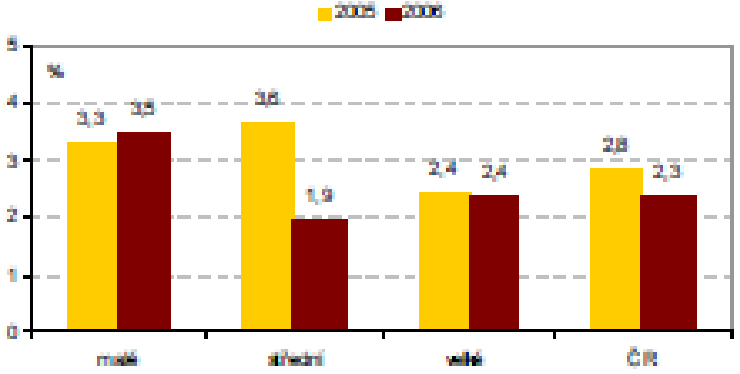
Share of innovative companies in key sectors in chosen EU countries



Revenues from sale of innovative products (services, products) according size of the company



Intenzity of innovative activities according size of the company



Tools to influence innovations

- Systematic innovation management
  - Corporate strategy
  - Collection of innovative incentives
  - Stipulate the priorities of innovation topics
  - Seeking for innovation ideas and creation of innovation specification
  - Discussion on the specification
  - Feasibility study
  - Decision
  - Processing of the project
  - Realization of innovation
  - Innovation work evaluation
- Investment into the RaD ?????
  - higher R&D spending does not guarantee "more creativity, higher profit or a greater market share (Aerospace and Defense: Inventing and Selling the Next Generation. Center for Strategic and International Studies, 2009)
- Cooperation

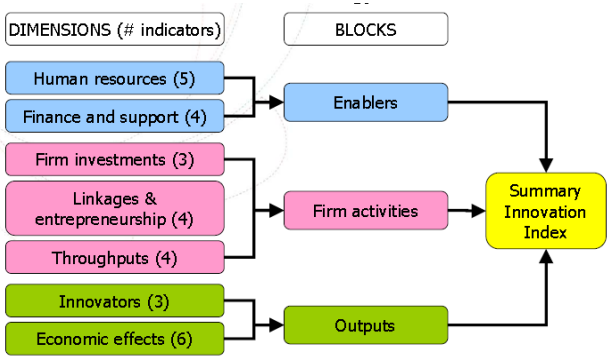
Innovation environment in the CR

- **Weaknesses**
  - Low number of students studying technical studies and science
  - Lower support of innovation by national institutions
  - Low number of innovative companies
  - low support of spin-off firms
  - Low emphasis on patents
  - Bad experience with realization of research results in practice
  - Low volume of risky capital
  - Absence of the innovation law
  - insufficient innovation infrastructure

Innovation environment in the CR

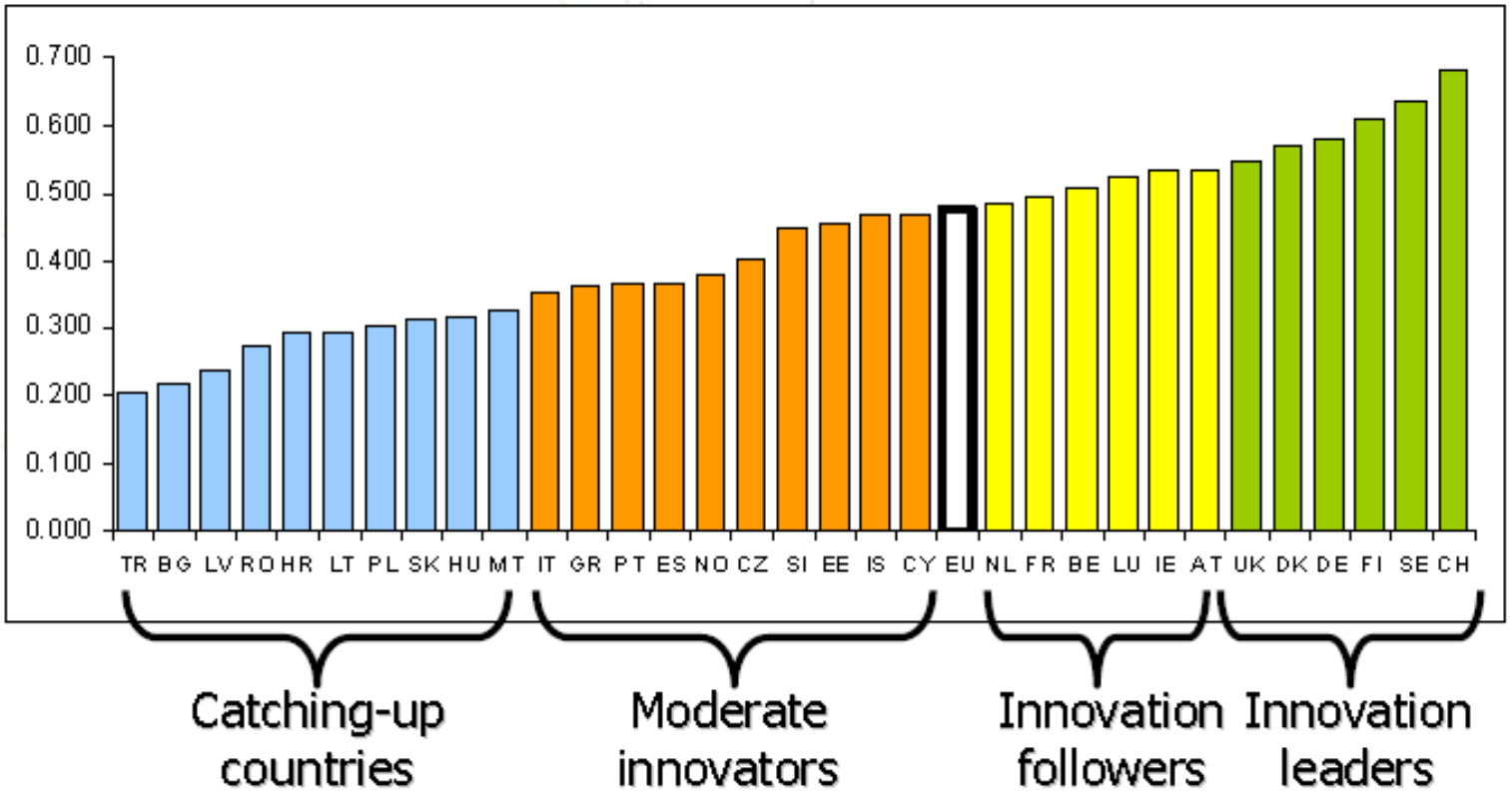
- **Strengths**
  - Tradition of industrial production and traditional innovative potential of workers
  - Growing interest of Universities to cooperate with industrial companies
  - Development of science and technology parks
  - Programmes supported by government
  - Interest of the public in innovation issue

Innovation and Europear

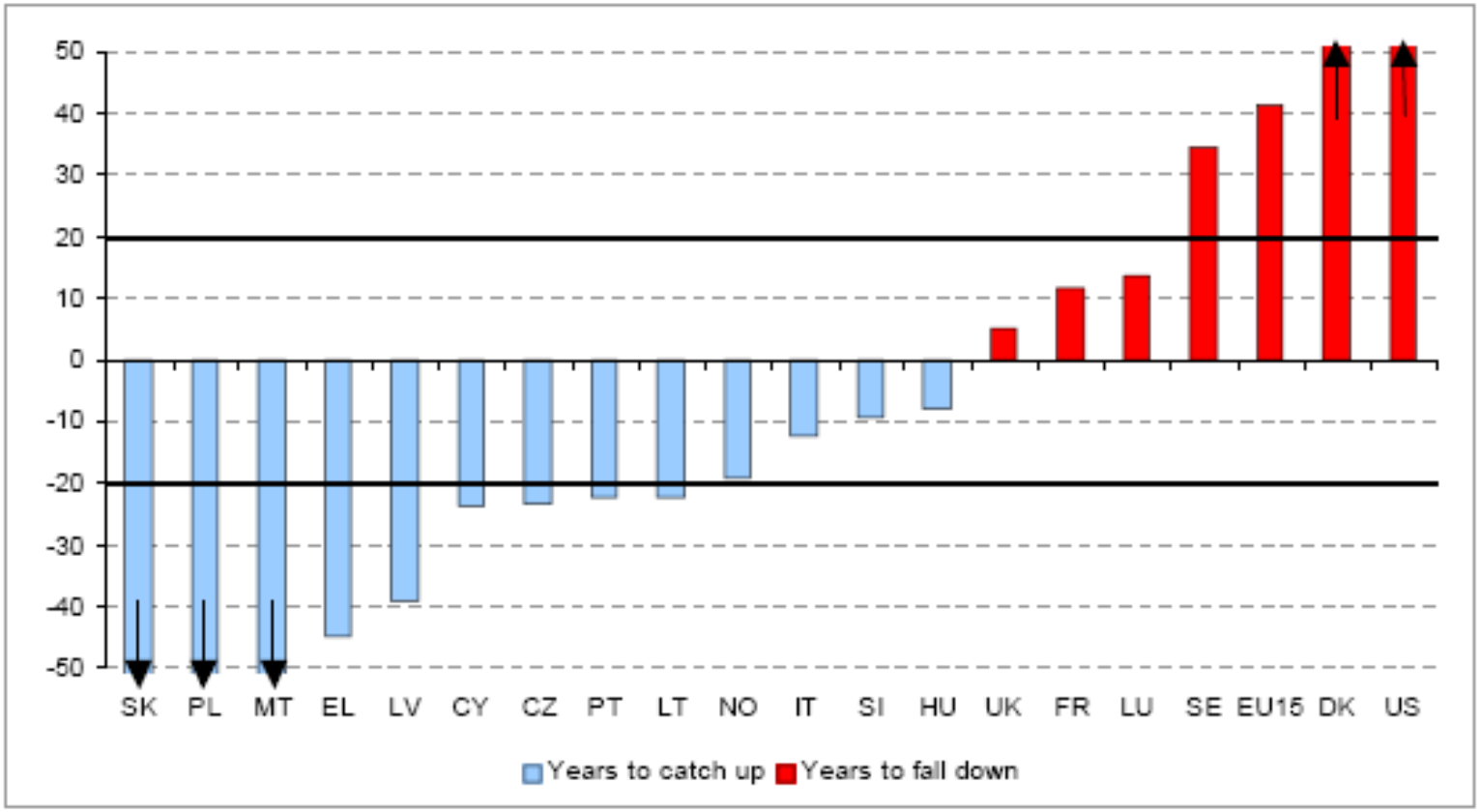


- Innovation and EU
  - Lisbon strategy
    - Adopted in Lisbon
    - Golas translated into the Framework Programmes for Reserach and Technological development
    - November 2009 – Wim Kok revised
  - EUROPE 2020
- Trendchart
  - EIS
  - Innobarometr
  - CIS

EIS 2008: innovation performance



Years to Catch Up or Decline to EU25 Average Innovation Performance



zdroj: European Innovation Scoreboard 2005, str. 13
source: European Innovation Scoreboard 2005, page 13

		Data source
	Human resources	
1.1.1	S&E and SSH graduates per 1000 population aged 20-29 (first stage of tertiary education)	Eurostat
1.1.2	S&E and SSH doctorate graduates per 1000 population aged 25-34 (second stage of tertiary education)	Eurostat
1.1.3	Population with tertiary education per 100 population aged 25-64	Eurostat
1.1.4	Participation in life-long learning per 100 population aged 25-64	Eurostat
1.1.5	Youth education attainment level	Eurostat
	Finance and support	
1.2.1	Public R&D expenditures (% of GDP)	Eurostat
1.2.2	Venture capital (% of GDP)	EVCA/ Eurostat
1.2.3	Private credit (relative to GDP)	IMF
1.2.4	Broadband access by firms (% of firms)	Eurostat

		Data source
	Firm investments	
2.1.1	Business R&D expenditures (% of GDP)	Eurostat
2.1.2	IT expenditures (% of GDP)	EITO/Eurostat
2.1.3	Non-R&D innovation expenditures (% of turnover)	Eurostat (CIS)
	Linkages & entrepreneurship	
2.2.1	SMEs innovating in-house (% of SMEs)	Eurostat (CIS)
2.2.2	Innovative SMEs collaborating with others (% of SMEs)	Eurostat (CIS)
2.2.3	Firm renewal (SMEs entries + exits) (% of SMEs)	Eurostat
2.2.4	Public-private co-publications per million population	Thomson/ ISI
	Throughputs	
2.3.1	EPO patents per million population	Eurostat
2.3.2	Community trademarks per million population	OHIM
2.3.3	Community designs per million population	OHIM
2.3.4	Technology Balance of Payments flows (% of GDP)	World Bank

		Data source
	Innovators	
3.1.1	Technological (product/service/process) innovators (% of SMEs)	Eurostat (CIS)
3.1.2	Non-technological (marketing/organisational) innovators (% of SMEs)	Eurostat (CIS)
3.1.3	Resource efficiency innovators Unweighted average of the following 2 indicators: o Reduced labour costs (% of firms) o Reduced use of materials and energy (% of firms)	 Eurostat (CIS) Eurostat (CIS)
	Economic effects	
3.2.1	Employment in medium-high & high-tech manufacturing (% of workforce)	Eurostat
3.2.2	Employment in knowledge-intensive services (% of workforce)	Eurostat
3.2.3	Medium and high-tech exports (% of total exports)	Eurostat
3.2.4	Knowledge-intensive services exports (% of total services exports)	Eurostat
3.2.5	New-to-market sales (% of turnover)	Eurostat (CIS)
3.2.6	New-to-firm sales (% of turnover)	Eurostat (CIS)

Innobarometer

- ***2001:*** experience and priorities, role of European integration in access to advanced technologies, mobilisation of human resources, protecting and sharingknowledge, access to funding and customer acceptance of innovations.
- ***2002:*** strengths and needs in innovation, investments made in innovation, output achieved, actual practice of co-operation and sharing of knowledge, role of training and education, development of managerial approaches to innovation and the contribution of enterprises to the public debate on innovation.
- ***2003:*** experience and priorities in the field of innovation, role of European integration in access to advanced technologies, mobilisation of human resources, protecting and sharing knowledge, access to funding and customer acceptance of innovations.
- ***2004:*** "Experience of European managers in innovative
- ***2005***: “Readiness for innovation in Europe”.
- ***2006***: “The role of clusters in facilitating innovation in Europe”.
- **2007 ways in which enterprises innovate, role of non-R&D based innovation, and the extent to which innovation is outsourced or transferred from other businesses or organisations. The survey investigated product- and process-related innovation separately**

The most innovative companies 2008

Rank	Company	HQ Country	HQ Continent	Revenue Growth 2004-07* (in %)	Margin Growth 2004-07* (in %)	Stock Returns 2004-07** (in %)	Most Known for its Innovative... (% who think so)
1	APPLE	USA	North America	47	69	83	Products (52%)
2	GOOGLE	USA	North America	73	5	53	Customer Experience (26%)
3	TOYOTA MOTOR	Japan	Asia	12	1	15	Processes (36%)
4	GENERAL ELECTRIC	USA	North America	9	1	3	Processes (43%)
5	MICROSOFT	USA	North America	16	8	12	Products (26%)
6	TATA GROUP	India	Asia	NA	NA	NA	Products (58%)
7	NINTENDO	Japan	Asia	37	4	77	Products (63%)
8	PROCTER & GAMBLE	USA	North America	16	4	12	Processes (30%)
9	SONY	Japan	Asia	8	13	17	Products (56%)
10	NOKIA	Finland	Europe	20	2	35	Products (36%)
11	AMAZON.COM	USA	North America	29	-11	28	Customer Experience (33%)
12	IBM	USA	North America	1	11	4	Processes (31%)
13	RESEARCH IN MOTION	Canada	North America	56	-1	51	Products (37%)
14	BMW	Germany	Europe	6	-5	11	Customer Experience (40%)
15	HEWLETT-PACKARD	USA	North America	10	17	35	Processes, Business Models, and Customer Experience (27% eac
16	HONDA MOTOR	Japan	Asia	12	6	14	Products (40%)
17	WALT DISNEY	USA	North America	6	14	7	Customer Experience (63%)
18	GENERAL MOTORS	USA	North America	-2	-98	-11	Products (55%)
19	RELIANCE INDUSTRIES	India	Asia	31	-7	94	Business Models (31%)
20	BOEING	USA	North America	9	32	21	Products (63%)
21	GOLDMAN SACHS GROUP	USA	North America	30	6	28	Processes and Business Models (33% each)
22	3M	USA	North America	7	5	3	Products (45%)
23	WAL-MART STORES	USA	North America	10	-2	-2	Processes (48%)
24	TARGET	USA	North America	11	3	NA	Customer Experience (67%)
25	FACEBOOK	USA	North America	NA	NA	NA	Customer Experience (51%)
26	SAMSUNG ELECTRONICS	South Korea	Asia	2	-14	8	Products (42%)
27	AT&T	USA	North America	43	6	23	Customer Experience (33%)
28	VIRGIN GROUP	Britain	Europe	NA	NA	NA	Customer Experience (47%)
29	AUDI	Germany	Europe	11	11	41	Products (50%)
30	MCDONALD'S	USA	North America	7	-7	25	Customer Experience (42%)
31	DAIMLER	Germany	Europe	-11	37	28	Products (35%)
32	STARBUCKS	USA	North America	23	-2	-13	Customer Experience (60%)
33	EBAY	USA	North America	33	-37	-17	Business Models (28%)
34	VERIZON COMMUNICATIONS	USA	North America	12	NA	9	Services (41%)
35	CISCO SYSTEMS	USA	North America	20	-5	12	Products (35%)
36	ING GROEP	Netherlands	Europe	7	4	11	Services (41%)
37	SINGAPORE AIRLINES	Singapore	Asia	9	5	20	Customer Experience (55%)
38	SIEMENS	Germany	Europe	1	21	22	Products (41%)
39	COSTCO WHOLESALE	USA	North America	11	-5	14	Customer Experience (46%)
40	HSBC	Britain	Europe	12	-1	4	Services (39%)
41	BANK OF AMERICA	USA	North America	12	NA	NA	Customer Experience and Services (23% each)
42	EXXON MOBIL	USA	North America	11	7	25	Processes (50%)
43	NEWS CORP.	USA	North America	4	4	4	Business Models (47%)
44	BP	Britain	Europe	14	-5	11	Processes (42%)
45	NIKE	USA	North America	8	-1	14	Customer Experience (43%)
46	DELL	USA	North America	7	-12	-17	Business Models (37%)
47	VODAFONE GROUP	Britain	Europe	7	-21	15	Business Models (33%)
48	INTEL	USA	North America	4	-10	6	Products (53%)
49	SOUTHWEST AIRLINES	USA	North America	15	9	-9	Customer Experience (50%)
50	AMERICAN EXPRESS	USA	North America	3	1	3	Customer Experience (35%)

THE MOST INNOVATIVE COMPANIES

Which companies do you consider most innovative?

	2006		2005
1.	Apple Computer	1.	Apple Computer
2.	Google	2.	3M
3.	3M	3.	General Electric (tie)
4.	Toyota Motor	3.	Microsoft (tie)
5.	Microsoft	5.	Sony
6.	General Electric	6.	Dell
7.	Procter & Gamble	7.	IBM
8.	Nokia	8.	Google
9.	Starbucks Coffee	9.	Nokia (tie)
10.	IBM	9.	Procter & Gamble (tie)

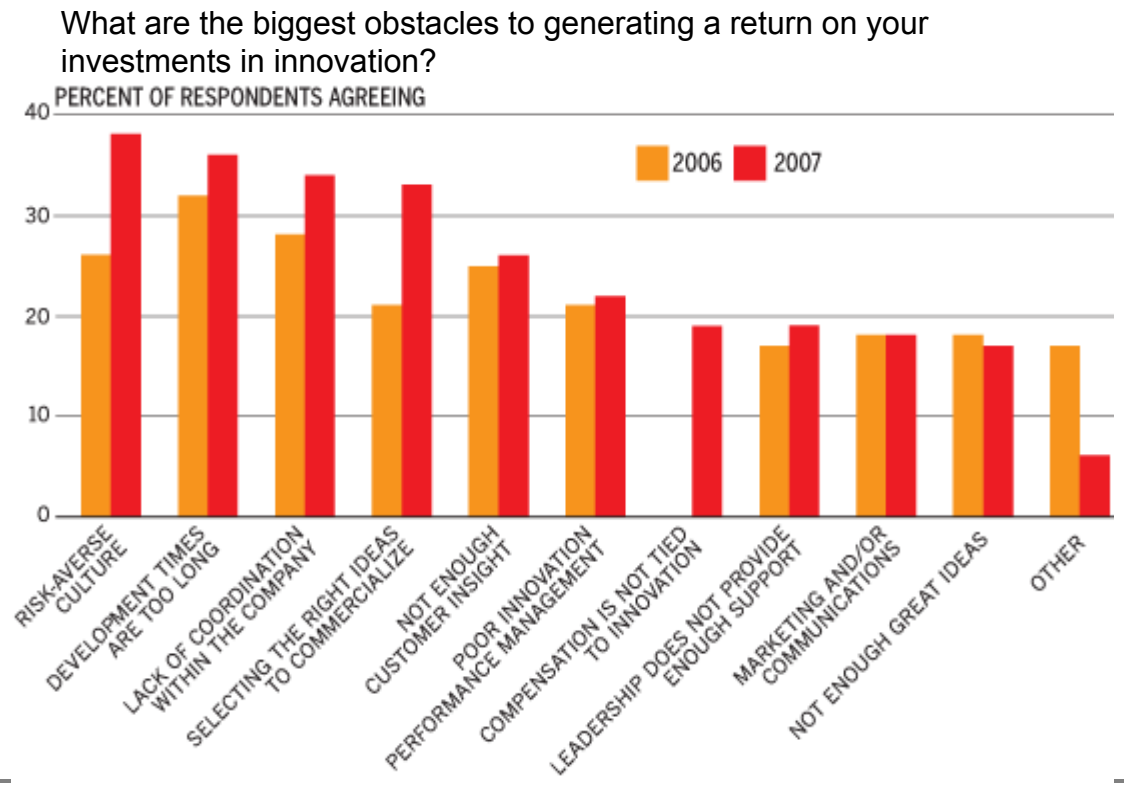
INDUSTRY LEADERS, PER THEIR PEERS

Which company in your industry do you consider most innovative?

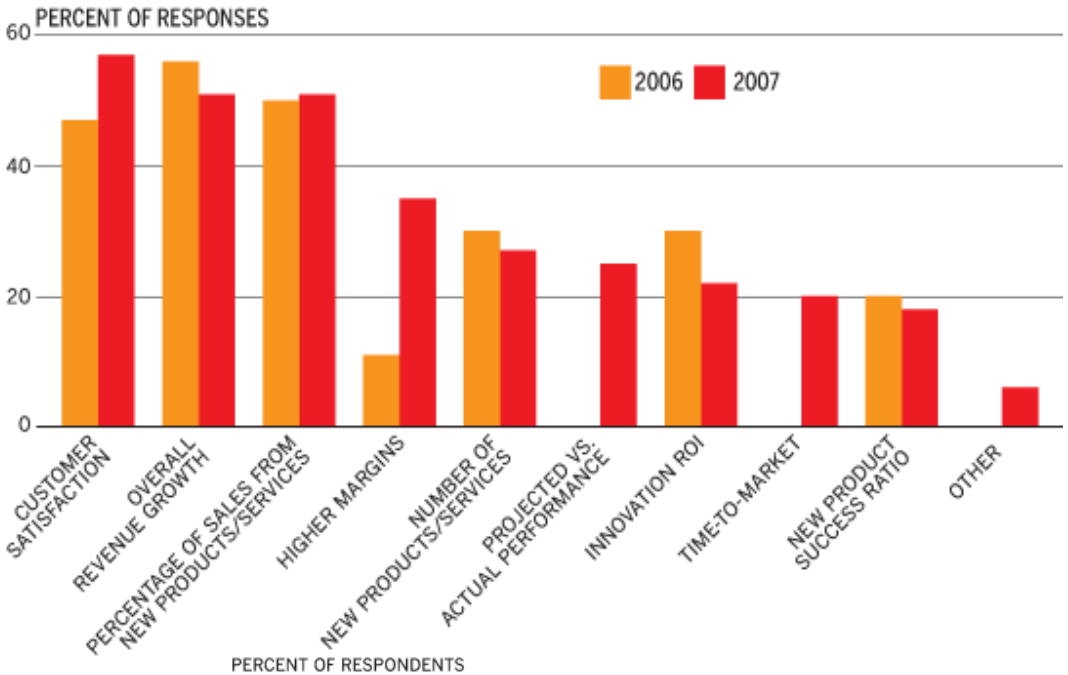
Industry	Company
Automotive	BMW
Consumer products/retail	Procter & Gamble
Financial services	ING Bank
Health care	Genentech
Industrial goods	3M
Technology/IT	Google
Telecommunications	NTT DoCoMo

Most Innovative Companies survey of senior executives 2007

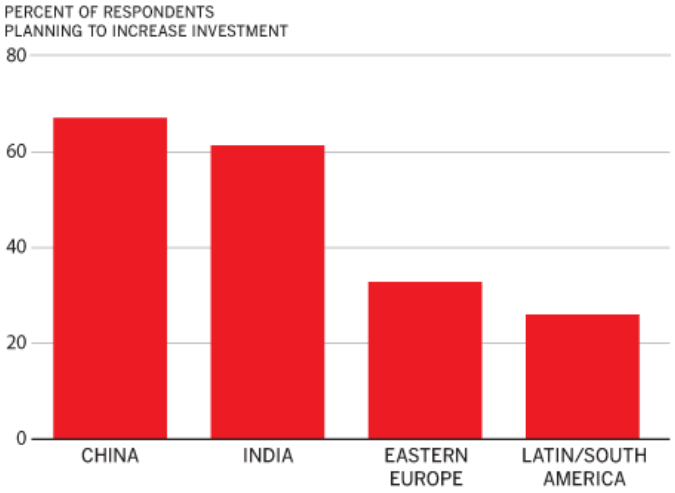
- BusinessWeek-Boston Consulting Group

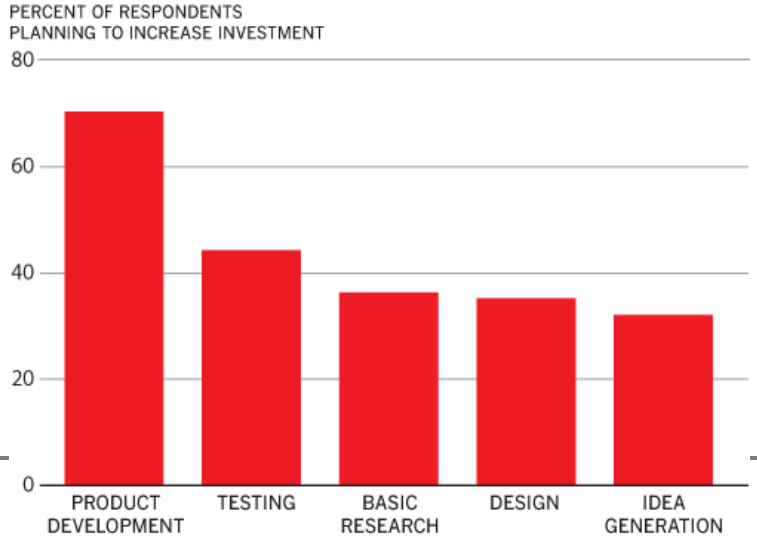


How does your company measure its success with innovation?



If your company is planning to increase its R&D investment in low-cost regions this year, in which of the following regions will you focus your attention?





If your company is planning to increase its R&D investment in low-cost regions this year, which of the following types of investment will you make?