

Main Characteristics of Industrial Research

Characteristic	Description	Function (R or D)	Source
Tasks types (routine vs exceptions)	Generally the tasks of researchers are different from development because the researcher is more oriented toward theoretical knowledge whereas the developer is repeating validated methods in order to engineer the product.	R	Leifer and Triskari (1987), Karlsson et al. (2004)
Time-lag (output vs outcome); originality	In research there is in general a significant time lag between output of research and the outcome resulting from this output. The steps turning the output into the outcome are generally not under the control of research. Generally, the research has the potential to generate disruptive "jumps" in knowledge resulting in innovations whereas development is more a continuous evolution of existing ideas.	R or D	Brown and Svenson (1988), Karlsson et al. (2004), Chiesa and Frattini (2007)
Validity of positive as well as negative outputs	In general the research outputs can be positive or negative, and in both cases represent valid research result	R	Hauber (2002), Prechelt (1997)
Output uncertainty nature of output - complexity/dynamism/ predictability/ controllability/secretcy	Generally the research outcome is uncertain to result in economically successful product or services. The risks are more commercial than technical.	R	Leifer and Triskari (1987)
Investment per se	From the time-lag characteristic and difficulty to precisely describe the research output results, there needs to be clear agreement that the research function is seen as an investment without tangible results.	R	Loch and Tapper (2002), Ojanen and Vuola (2006)
Different stakeholders and different communication methods	The research department, depending on the type of research projects it conducts, has a variety of stakeholders: e. g. academia, industrial partners, political bodies, media, and internal units, such as the development department, communication and marketing departments, and top management being the most important.	R	Beck and Volker (2009)
Knowledge depth	The profile of a typical researcher usually requires a specific competence (specialised knowledge) within an area, which takes long time to acquire, whereas the knowledge of a wide range of areas is required for a profile of a developer (general competence).	R	Karlsson et al. (2004)
Quantifiability of the output	The results of industrial research departments have no immediate commercial value, it is generally difficult to directly quantify monetary value of research output.	R	Chiesa and Frattini (2007)
Definition of the output	It is generally difficult to define in advance and therefore measure the "expected output" due to its uniqueness and lack of repeatability	R	Karlsson et al. (2004)

Sources:

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