

Indicators for R&D performance

(from Lazzarotti, V., Manzini, R., Mari L., (2011) A model for R&D performance measurement, *International Journal of Production Economics*, 134, pp. 212-223)

<i>Performance perspective</i>	<i>Type of indicator</i>	<i>Indicators</i>
1. Financial perspective	Input	R&D annual spending Annual spending to replace machines (last 3-years average)
	Process	Average cost of each completed project
	Output	Sales by projects of innovation technology Cost reduction by project of innovation technology
2. Customer perspective	Input	Annual spending for market investigations aimed at generating innovation technology Annual spending to promote knowledge about the innovation technology created by firm
	Process	Percentage of projects in which customers are operatively involved (training, test, problem solving)
	Output	Time to market Product range increasing by innovation technology (percentage)
3. Innovation and learning perspective	Input	Training expenses in favor of people dedicated to innovation technology Percentage of people having a pertinent degree (with respect all the people devoted to innovation technology) Percentage of graduates with scientific competences
	Process	Time dedicated to the analysis of reasons for failure of previous projects Number of innovation- technology projects in progress
	Output	Number of scientific publications Number of patents registered Number of new markets in process of development thanks to innovation- technology projects Number of new (or improved) products/services and processes
4. Internal business perspective	Input	Number of employees devoted to R&D
	Process	Percentage of innovation activities formally documented Average cost of the abandoned projects Percentage of projects using techniques such as: design for assembly, design for manufacturing, design for logistic, design to cost
	Output	Percentage of projects respecting established deadlines Average time of delay in the completion of innovation-technology projects Percentage of projects respecting established budget Percentage of projects that achieve the established goals (cost reduction or sales increasing) Percentage of projects abandoned before completion Part of above percentage due to lack of funds Part of above percentage due to lack of competences
5. Alliances and networks perspective	Input	Number of employees dedicated to external relationships in R&D Percentage of time (of the innovation-technology people) devoted

<i>Performance perspective</i>	<i>Type of indicator</i>	<i>Indicators</i>
		to manage external collaborations
	Process	<p>Average cost of projects carried out in external collaboration</p> <p>Percentage of projects in collaboration using techniques such as: design for assembly, design for manufacturing, design for logistic, design to cost</p> <p>Percentage of projects in collaboration respecting established deadlines and budget</p>
	Output	<p>Number of alliances dedicated to innovation technology</p> <p>Percentage of alliances dedicated to explore radical innovation</p> <p>Number of technological licences acquired for innovation-technology purposes</p> <p>Overall value of the acquired licences in</p> <p>Number of licences out for innovation-technology purposes</p> <p>Overall value of the sold licences out</p> <p>Percentage of projects in collaboration that achieve the established goals (cost reduction or sales increasing)</p> <p>Percentage of projects in collaboration abandoned before completion</p> <p>Number of scientific publications obtained in collaboration</p> <p>Number of patents registered in collaboration</p> <p>Number of new markets in process of development thanks to innovation- technology projects in collaboration</p> <p>Number of new (or improved) products/services and processes obtained in collaboration</p>