

Appendix I: Methodology

This study uses the same methodology that was applied in previous McKinsey Global Institute reports. First, productivity was measured for six sectors in France, Germany, and the US. We then sought to understand the causes of the differences in productivity levels and rates of growth between the countries.

Measuring labor productivity – Productivity is measured by calculating the ratio of output to input. We first define the output measure for each sector. In some industries, physical production quantities are perfectly adequate. In others, monetary values are used. In theory, both methods should yield the same results.

Physical output – This was used in Telecommunication, Utilities, Road freight, and Retail banking. In each sector, distinctly different types of output were captured separately and, then, aggregated using relative values. In telecommunications, for instance, fixed-line and mobile call minutes were counted independently. Their relative prices were used to combine them, effectively giving a mobile call minute a higher value than a fixed-line call minute. This method has the advantage of allowing for comparison through time, and between countries, without distortions due to inflation or inadequate exchange rates.

Monetary measurement – In Automotive and Retail trade, real value added was used as the output measure.¹ This is the difference between the revenues earned from customers and the costs paid to suppliers and service providers. It represents the value created by the labor and capital inputs. This data was then adjusted to account for inflation and compared across countries, using Purchasing Power Parity (PPP) to avoid distortions due to exchange rate fluctuations.

In all six sectors, input is measured as the number of hours worked, which takes into account differences in working time per employee.

The methodological details applied for each sector are described in depth at the end of each sector chapter.

Explaining causality – To explain why productivity varies through time and between countries, we use a systematic framework that explains differences for three hierarchical layers of causality, as well as the interactions between them.

¹ In retail trade, gross margin was used as a close proxy for value added.

First, we consider differences observed at the firm level, for instance, capacity utilization. Next, we analyze the factors arising from industry dynamics (e.g., competitive intensity) and the impact of external factors (e.g., regulation) that explain these firm-level findings. This research is based on publicly available data, surveys, and company or expert interviews that allow us to assess the relative importance of the causal factors in explaining the productivity differences in each sector.

Firm level. The first set of factors affecting productivity arises at the firm level. Firm-level factors in the framework are jointly determined by decisions made by its managers and by elements of a firm's external environment beyond its control.

- ¶ *Output mix.* The mix of products demanded or supplied may differ over time or between countries, and a productivity advantage or penalty can arise if output consists of a higher share of product or service categories that can be produced at an inherently higher or lower level of productivity (due, for example, to design changes that simplify the production process and improve productivity). Within product categories, the quality of the product produced may also differ. Production of higher-value-added products or services using similar levels of inputs is reflected in higher productivity. Another source of productivity differences within product categories is differences in product range. A wider range of product or service lines can reflect a suboptimal product mix that reduces productivity.
- ¶ *Non-IT capital /capacity.* We use the term capital in the sense of physical assets and their embodied processes (e.g., machines, plants, and buildings). Capital can influence labor productivity if an industry works with a high level of capital intensity, i.e., uses more capital in combination with each unit of labor than other industries. We expect that this industry would show higher labor productivity.
- ¶ *IT capital/technology.* In analogy to the above, IT-capital is composed of assets that are related to information and communication technology. A more technologically advanced stock of capital should enhance labor productivity.
- ¶ *Intermediate inputs.* This designates the effect of higher value/quality inputs (including embedded technology).
- ¶ *Labor skills.* This refers to the current and potential skill level exhibited in the pool of labor from which a company chooses employees. Firms can either train employees from scratch, which takes time, or employ ready-trained workers.
- ¶ *Labor economies of scale/capacity utilization.* Productivity in industries that operate with a significant amount of fixed labor will be strongly

affected by the leverage of these labor pools, i.e., how much output is generated with a given amount of labor inputs. Similarly, capacity utilization will play an important role where a fixed amount of labor input is required to maintain that capacity.

- ¶ *Organization of functions and tasks (OFT)/process design.* This is a broad category encompassing the way in which production processes and other key functions (product development, sales, marketing) are organized and run. It reflects managerial practices in most areas of the business system, as well as the structure of incentive systems that employees and companies face.

Industry level. The competitive pressure in the industry influences the pressure on management to adopt best practices in the production process.

- ¶ *Competitive intensity.* This reflects differences in the industry structure and the resulting competitive behavior of domestic players. Other factors being equal, more competitive industries will put more pressure on managers to adopt more productive processes.
- ¶ *Price/demand effects.* Endogenous changes in prices and/or demand can affect industry productivity.
- ¶ *Exposure to best practice.* Productivity will be higher in the country where the market participants are exposed to the globally most productive company. Where barriers limit the entry or the successful market participation of the leading player, pressure to improve productivity will not be as high.

External level. These factors are outside the control of firms but influence how they operate.

- ¶ *Demand factors.* Macroeconomic/financial markets, consumer preferences, income levels, etc. may lead to differences in output volume and output mix.
- ¶ *Technology/business innovation.* Technological or managerial innovation in own or related industry is an important factor particularly for productivity growth.
- ¶ *Regulation.* Regulations prohibiting or discouraging certain products or service offerings (including regulations on pricing) can impact productivity. Product-market regulations can also limit or distort competition by protecting or favoring incumbent companies.
- ¶ *Up- /downstream industries.* Upstream suppliers or downstream industries can affect productivity by reducing or increasing competitive pressures on industry players. An underdeveloped upstream industry can

also impose significant productivity costs on its clients by not providing products or services that facilitate production or by delivering outputs with lower quality and/or at high fluctuations.

- ¶ *Capital markets/governance.* Where ownership structures or governance models ensure effective pressure on management, productivity will increase. Privatizations are an example of how this factor affects productivity.
- ¶ *Labor market.* Regulations or restrictions placed on the labor market influence how firms organize and operate, and may induce differences in productivity.

Appendix II: Glossary of terms used

Term	Definition
BEA	Bureau of Economic Analysis, US Department of Commerce.
BLS	Bureau of Labor Statistics, US Department of Labor.
Business cycle	Economy-wide fluctuations in output, incomes, and employment.
Capital	1. The equipment and structures used in the production process 2. The funds to finance the accumulation of equipment and structures.
Capital deepening	An increase in capital per employee (one of the sources of growth in output from the growth accounting framework).
Capital intensity	Capital stock (of IT or other types of capital) per worker or hour worked, unless defined otherwise.
CPI	Consumer price index. A measure of the overall level of prices that shows the cost of a fixed basket of consumer goods relative to the cost of the same basket in a base year.
CRM	Customer Relationship Management. Refers to IT-enabled efforts to profile and segment the customer base, and to increase marketing effectiveness by tailoring campaigns to specific segments.
Deflator	A price index; used to convert nominal numbers to quality adjusted output measures by eliminating price changes due to inflation.
GDP	Gross Domestic Product. Calculated by the national statistical agencies as the aggregation of value added across all of the sectors of the economy.
Growth accounting	Divides the growth in output of the economy into three different sources: increases in capital, increases in labor and "Solow residual" (increases in total factor productivity).
INSEE	Institut national de la statistique et des études économiques, the French national statistical agency.

IT	Information technology. In this report, IT refers specifically to computer hardware, computer software, and communications equipment.
IT paradox	Refers to Robert Solow's 1987 comment (also known as the 'Solow paradox') that “you can see the computer age everywhere but in the productivity statistics.” It describes the observation that IT has grown dramatically without a commensurate increase in productivity growth.
Multi-factor productivity	See total factor productivity.
Mix shift effect	Impact on productivity as a result of changes in the sector mix of an economy. For example, if an industry with higher productivity levels than the national average grows in terms of its share of employment within an economy, overall productivity will rise in this economy – even if productivity levels do not change within each sector.
Nominal	Measured in current currency units; not adjusted for inflation.
OFT	Organization of functions and tasks. The way in which production processes and other key functions (product development, sales, marketing) are organized and run.
Productivity	Unless specifically noted, productivity in this report refers to labor productivity (rather than total factor or capital productivity).
Real	Measured in constant dollars; adjusted for inflation.
StBA	Statistisches Bundesamt, the German national statistical agency
Substitution to higher value goods	Increase in proportion of consumption of higher value goods resulting from changes in relative prices or increase in wealth.
TFP	Total factor productivity. Output growth that cannot be accounted for by growth in inputs; also known as the "Solow residual".
Value added	The value of a firm's output minus the value of the intermediate goods the firm purchased. Corresponds to the sum of operating profits and wages.