

# World - Innovation and Development around the World 1960-2000

**Daniel Lederman and Laura Saenz**

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## Overview

### Identification

ID NUMBER  
WLD\_2000\_ID\_v01\_M

### Version

VERSION DESCRIPTION

PRODUCTION DATE

NOTES

### Overview

ABSTRACT

Dataset used in World Bank Policy Research Working Paper #3774 (November 2005).

The data include measures of innovation outcomes as well as variables related to innovation effort. The main indicator of innovation outputs is patents. The main variables related to innovation inputs are investment in research and development (R&D) and technical personnel (engineers, scientists) working in R&D activities. The sources of these data are publicly available (OECD, UNESCO, etc.), yet there have been few attempts at double checking the consistency of these data and digitizing observations dating back to the 1960s.

KIND OF DATA  
Aggregate data [agg]

UNITS OF ANALYSIS

### Scope

NOTES

The dataset includes:

- R&D expenditure
- Patents

### Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Daniel Lederman and Laura Saenz	World Bank

OTHER PRODUCER(S)

Name	Affiliation	Role

DATE OF METADATA PRODUCTION  
2010-09-07

DDI DOCUMENT VERSION  
version 01 (September 2010)

DDI DOCUMENT ID  
DDI\_WLD\_2000\_ID\_v01\_M

## Sampling

### **Sampling Procedure**

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### **Deviations from Sample Design**

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### **Response Rate**

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### **Weighting**

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# Questionnaires

## Overview

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## Data Collection

### Data Collection Dates

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Start	End	Cycle
1960	2000	N/A

### Time Periods

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Start	End	Cycle
1960	2000	N/A

### Data Collection Mode

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Other [oth]

### Data Collection Notes

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### Questionnaires

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### Supervision

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Data Processing

**Data Editing**

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**Other Processing**

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## Data Appraisal

### **Estimates of Sampling Error** **Other forms of Data Appraisal**

## File Description

## Variable List

Content	The data include measures of innovation outcomes as well as variables related to innovation effort. The main indicator of innovation outputs is patents. The main variables related to innovation inputs are investment in research and development (R&D) and technical personnel (engineers, scientists) working in R&D activities. The sources of these data are publicly available (OECD, UNESCO, etc.), yet there have been few attempts at double checking the consistency of these data and digitizing observations dating back to the 1960s.
Cases	8295
Variable(s)	33
Structure	Type: Keys: ()
Version	
Producer	
Missing Data	

## Variables

ID	NAME	LABEL	TYPE	FORMAT	QUESTION
V1	country	Country	discrete		
V2	code	Country code	discrete		
V3	year	Year	discrete		
V4	eap	East Asia and the Pacific	discrete		
V5	eca	Europe and Central Asia	discrete		
V6	lac	Latin America and the Caribbean	discrete		
V7	mena	Middle East and North Africa	discrete		
V8	sha	Sub-Saharan Africa	discrete		
V9	sa	South Asia	discrete		
V10	hi	High income	discrete		
V11	pat	Total patents granted by the USPTO by year for each country	contin		
V12	patepo	Total patents granted by the EPO by year for each country	contin		
V13	royal	Royalties and license fees, payments	contin		
V14	rdexp	R&D expenditure	contin		
V15	rdper	R&D personnel	contin		
V16	rdfinabro	R&D expenditure financed with funds from abroad	contin		
V17	rdfinprod	R&D expenditure financed by the productive sector	contin		
V18	rdperfprod	R&D expenditure performed by the productive sector	contin		
V19	rdperfhe	R&D expenditure performed by higher education	contin		
V20	rdperfpub	R&D performed by the public sector	contin		
V21	lowrdexp		discrete		
V22	lowrdfinprod		discrete		
V23	lowrdperfprod		discrete		
V24	y		contin		
V25	stockpatepo	Stock of patents granted by the EPO	contin		
V26	poptotal		contin		
V27	labor		contin		

V28	rdexpgdp	R&D expenditure as percentage of G.D.P.	contin
V29	patgrantedstock		contin
V30	plantpatstock		contin
V31	designpatstock		contin
V32	plantpat		contin
V33	designpat		contin



## Country(country)

## File: Innovation\_and\_Development\_Database

**Overview**

Type: Discrete  
Width: 30

Valid cases: 8295  
Invalid: NaN

**Source of information**

Country

## Country code(code)

## File: Innovation\_and\_Development\_Database

**Overview**

Type: Discrete  
Width: 3

Valid cases: 8295  
Invalid: NaN

**Source of information**

Country code

## Year(year)

## File: Innovation\_and\_Development\_Database

**Overview**

Type: Discrete  
Width: 4

Valid cases: 8295  
Invalid: NaN  
Minimum: 1960  
Maximum: 2002

**Source of information**

Year

## East Asia and the Pacific(eap)

## File: Innovation\_and\_Development\_Database

**Overview**

Type: Discrete  
Width: 1

Valid cases: 8295  
Invalid: NaN

**Source of information**

East Asia and the Pacific

## Europe and Central Asia(eca)

## File: Innovation\_and\_Development\_Database

**Overview**

Type: Discrete  
Width: 1

Valid cases: 8295  
Invalid: NaN

**Source of information**

Europe and Central Asia

## Latin America and the Caribbean(lac) File: Innovation\_and\_Development\_Database

### Overview

Type: Discrete  
Width: 1

Valid cases: 8295  
Invalid: NaN

### Source of information

Latin America and the Caribbean

## Middle East and North Africa(mena) File: Innovation\_and\_Development\_Database

### Overview

Type: Discrete  
Width: 1

Valid cases: 8295  
Invalid: NaN

### Source of information

Middle East and North Africa

## Sub-Saharan Africa(sha) File: Innovation\_and\_Development\_Database

### Overview

Type: Discrete  
Width: 1

Valid cases: 8295  
Invalid: NaN

### Source of information

Sub-Saharan Africa

## South Asia(sa) File: Innovation\_and\_Development\_Database

### Overview

Type: Discrete  
Width: 1

Valid cases: 8295  
Invalid: NaN

### Source of information

South Asia

## High income(hi) File: Innovation\_and\_Development\_Database

### Overview

Type: Discrete  
Width: 1

Valid cases: 8294  
Invalid: 1

### Source of information

High income

## Total patents granted by the USPTO by year for each country(pat) File: Innovation\_and\_Development\_Database

**Overview**

Type: Continuous  
Width: 5

Valid cases: 7132  
Invalid: 1163  
Minimum: NaN  
Maximum: 87607  
Mean: 478.6  
Standard deviation: 4195

**Description**

Patent by USPTO: Property right granted by the Government of the United States of America to an inventor "to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States" for a limited time in exchange for public disclosure of the invention when the patent is granted.

**Source of information**

Total patents granted by the USPTO by year for each country

## Total patents granted by the EPO by year for each country(patepo) File: Innovation\_and\_Development\_Database

**Overview**

Type: Continuous  
Width: 5

Valid cases: 3114  
Invalid: 5181  
Minimum: NaN  
Maximum: 10300  
Mean: 173.5  
Standard deviation: 937.4

**Description**

Patent by EPO: Legal title granting its holder the exclusive right to make use of an invention for a limited area and time by stopping others from, amongst other things, making, using or selling it without authorization. A European patent can be obtained by filing a single application in one of the official languages of the European Patent Office (English, French or German) in a unitary procedure before the EPO and is valid in as many of the contracting states as the applicant cares to designate. A European patent affords the same rights in the designated contracting states as a national patent granted in any of these states.

**Source of information**

Total patents granted by the EPO by year for each country

## Royalties and license fees, payments(royal) File: Innovation\_and\_Development\_Database

**Overview**

Type: Continuous  
Width: 11

Valid cases: 2382  
Invalid: 5913  
Minimum: NaN  
Maximum: 16400000000  
Mean: 319475495.9  
Standard deviation: 1168250143.1

**Source of information**

Royalties and license fees, payments

## R&D expenditure(rdexp) File: Innovation\_and\_Development\_Database

**Overview**

Type: Continuous  
Width: 12

Valid cases: 1395  
Invalid: 6900  
Minimum: 5161.2  
Maximum: 243000000000  
Mean: 9501998412.8  
Standard deviation: 28847009139.8

### Description

Research and experimental development (R&D)

In general R&D is defined as any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture, and society, and the use of this knowledge to devise new applications. It includes fundamental research, applied research, and experimental development.

Fundamental Research: Any activity directed towards the increase of scientific knowledge or discovery of new fields of investigation, without any specific practical objective.

Applied research: Any activity directed towards the increase of scientific knowledge but with a specific practical aim in view.

Experimental development: Systematic use of the results of fundamental and applied research and of empirical knowledge directed towards the introduction of new materials, products, devices, processes and methods, or the improvement of existing ones, including the development of prototypes and pilot plants.

R&D Investment :The measurement of R&D investment is calculated on the basis of intramural current expenditure, including overheads, and intramural capital expenditure. The sum of the intramural expenditures incurred by the national institutions provides the total domestic expenditure which is the information presented at the international level. Total domestic expenditure on R&D activities refers to all expenditure made for this purpose in the course of a reference year in institutions and installations established in the national territory as well as installations physically situated abroad. The total expenditure for R&D as defined above comprises current expenditure, including overheads, and capital expenditure.

### Source of information

R&D expenditure

## R&D personnel(rdper)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 7

Valid cases: 1313  
Invalid: 6982  
Minimum: NaN  
Maximum: 1522200  
Mean: 77215.1  
Standard deviation: 194692.5

### Description

R&D personnel corresponds to scientists and engineers, comprising persons working in those capacities, i.e. as persons with scientific or technological training (usually completion of third level education) in any field of science, who are engaged in professional work on R&D activities, administrators and other high-level personnel who direct the execution of R&D activities.

### Source of information

R&D personnel

## R&D expenditure financed with funds from abroad(rdfinabro)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 3

Valid cases: 894  
Invalid: 7401  
Minimum: NaN  
Maximum: 100  
Mean: 5.4  
Standard deviation: 10.6

### Description

Foreign funds are funds received from abroad for national R&D activities.

### Source of information

R&amp;D expenditure financed with funds from abroad

## R&D expenditure financed by the productive sector(rdfinprod)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous

Width: 16

Valid cases: 1111

Invalid: 7184

Minimum: NaN

Maximum: 94.7

Mean: 41.2

Standard deviation: 21.5

#### Description

The productive sector includes both domestic and foreign-owned industrial and trading establishments located in the country, which produce and distribute goods and services for sale, and organizations directly serving them, whatever their form of ownership, private, non-profit, or government. It also includes government monopolies and nationalized industries, particularly public utilities, transport undertakings, post offices, communications and broadcasting, and all other government establishments which function as productive units. Also included are governmental or non-governmental organizations and private non-profit institutions mainly or exclusively serving industrial or trading establishments, except those institutes, experimental stations, etc., operating under the direct control of, or being associated with institutions of higher education. In former socialist countries, R&D institutes of branch ministries were classified in this sector.

#### Source of information

R&amp;D expenditure financed by the productive sector

## R&D expenditure performed by the productive sector(rdperfprod)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous

Width: 3

Valid cases: 850

Invalid: 7445

Minimum: NaN

Maximum: 100

Mean: 51.2

Standard deviation: 21.2

#### Source of information

R&amp;D expenditure performed by the productive sector

## R&D expenditure performed by higher education(rdperfhe)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous

Width: 16

Valid cases: 992

Invalid: 7303

Minimum: NaN

Maximum: 77.7

Mean: 21.7

Standard deviation: 12.7

#### Description

The higher education sector relates to establishments of education at the third level and also includes those research institutes, experimental stations, etc, serving them.

#### Source of information

R&amp;D expenditure performed by higher education

## R&amp;D performed by the public sector(rdperfpub)

File: Innovation\_and\_Development\_Database

**Overview**Type: Continuous  
Width: 3Valid cases: 845  
Invalid: 7450  
Minimum: NaN  
Maximum: 100  
Mean: 27.3  
Standard deviation: 19.2**Description**

The public sector, or general service sector, includes various public or government establishments serving the community as a whole.

**Source of information**

R&D performed by the public sector

## (lowrdexp)

File: Innovation\_and\_Development\_Database

**Overview**Type: Discrete  
Width: 1Valid cases: 177  
Invalid: 8118

## (lowrdfinprod)

File: Innovation\_and\_Development\_Database

**Overview**Type: Discrete  
Width: 1Valid cases: 6392  
Invalid: 1903

## (lowrdperfprod)

File: Innovation\_and\_Development\_Database

**Overview**Type: Discrete  
Width: 1Valid cases: 6392  
Invalid: 1903

## (y)

File: Innovation\_and\_Development\_Database

**Overview**Type: Continuous  
Width: 13Valid cases: 4174  
Invalid: 4121  
Minimum: 291000000  
Maximum: 9010000000000  
Mean: 185654029947.3  
Standard deviation: 676050303281.3

## Stock of patents granted by the EPO(stockpatepo)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous	Valid cases: 3114
Width: 6	Invalid: 5181
	Minimum: NaN
	Maximum: 122157
	Mean: 1470.7
	Standard deviation: 9137.9

#### Source of information

Stock of patents granted by the EPO

## (poptotal)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous	Valid cases: 6543
Width: 10	Invalid: 1752
	Minimum: 500920
	Maximum: 1270000000
	Mean: 28883877.5
	Standard deviation: 101642484.6

## (labor)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous	Valid cases: 5226
Width: 9	Invalid: 3069
	Minimum: 72589
	Maximum: 862210000
	Mean: 19789715.1
	Standard deviation: 68176401.1

## R&D expenditure as percentage of G.D.P.(rdexpgdp)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous	Valid cases: 1390
Width: 20	Invalid: 6905
	Minimum: 0
	Maximum: 4.4
	Mean: 1
	Standard deviation: 0.8

#### Source of information

R&D expenditure as percentage of G.D.P.

## (patgrantedstock)

### File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 7

Valid cases: 7424  
Invalid: 871  
Minimum: NaN  
Maximum: 1957665  
Mean: 7329.7  
Standard deviation: 78622.2

(plantpatstock)

File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 4

Valid cases: 4762  
Invalid: 3533  
Minimum: NaN  
Maximum: 4843  
Mean: 17.8  
Standard deviation: 193.3

(designpatstock)

File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 6

Valid cases: 4762  
Invalid: 3533  
Minimum: NaN  
Maximum: 141143  
Mean: 416.8  
Standard deviation: 5017.6

(plantpat)

File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 3

Valid cases: 4747  
Invalid: 3548  
Minimum: NaN  
Maximum: 518  
Mean: 2  
Standard deviation: 17.8

(designpat)

File: Innovation\_and\_Development\_Database

#### Overview

Type: Continuous  
Width: 5

Valid cases: 4747  
Invalid: 3548  
Minimum: NaN  
Maximum: 11285  
Mean: 47.3  
Standard deviation: 479.7

# Documentation

## Reports

### Innovation and Development around the World, 1960-2000

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Title Innovation and Development around the World, 1960-2000

Author(s) Daniel Lederman Laura Saenz

Date 2005-11-01

Language English

This paper presents a database of indicators of innovative activity around the world since the early 1960s. The data include measures of innovation outcomes as well as variables related to innovation effort. The main indicator of innovation outputs is patents. The main variables related to innovation inputs are investment in research and development (R&D) and technical personnel (engineers, scientists) working in R&D activities. The sources of these data are publicly available (OECD, UNESCO, etc.), yet there have been few attempts at double checking the consistency of these data and digitizing observations dating back to the 1960s. After discussing the sources and definitions of the data, the paper examines trends and patterns of innovation outputs and inputs by looking at the over-time behavior of the relevant series and comparing the performance of developing and high-income countries. The authors also provide cross-regional comparisons and a detailed examination of trends in selected countries. In turn, the authors provide estimates of the impact of innovation on long-run development by following an emerging empirical literature on the determinants of levels of GDP per capita. The econometric results suggest that innovation might indeed have strong positive effects on long-run development, which might be stronger than the direct effects of institutions. The analysis pays close attention to issues related to the potential endogeneity of innovation (and institutions) with respect to the level of development.

Filename wps3774.pdf

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## Other materials

### Excel to Stata Conversion Program (Stata 10)

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Title Excel to Stata Conversion Program (Stata 10)

Author(s) Development Data Group (DECDG), World Bank

Language English

Description Before running this program the excel format data should be saved as csv format.

Filename ID\_data\_conversion.do

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