

Robotics is a high-tech topic

and very advanced designs are investigated
in Japan, USA, ...

Why should we do investigation in Robotics

when in small group ?
with limited funds?

Answers:

good ideas do not need

- lot of people
- large funding

to maintain wide circulation of Know-how

- all should not depend from few!
- “University” teaches “universal” knowledge!

Industrial/diary applications need systems with

- Low-cost design
- Easy operation

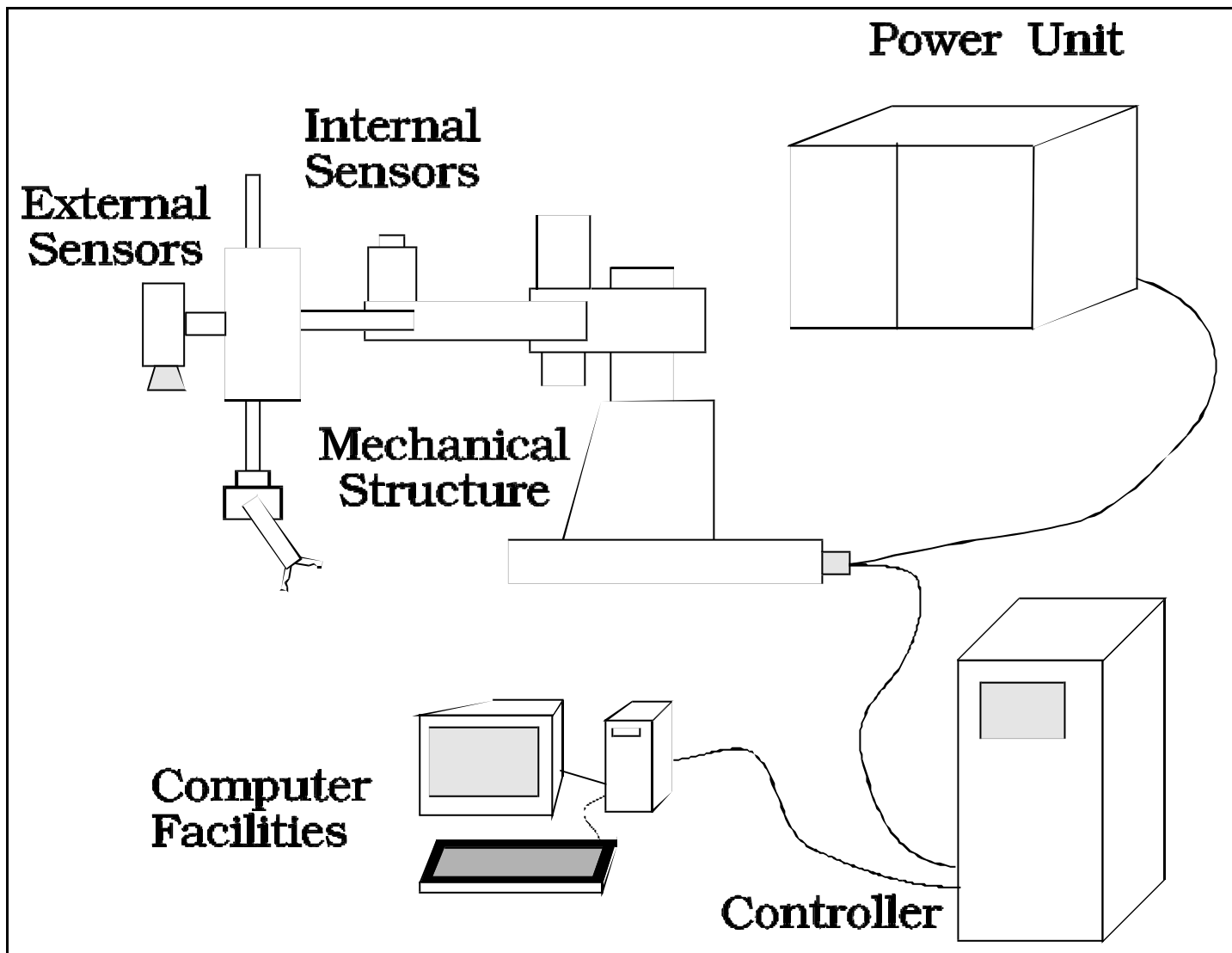


Fig.1 A robot system with basic components.

The flexibility of a robot refers to the capability of reprogramming the operation of the system for a variety of tasks.

The versatility of a robot refers to the capability of performing a variety of manipulation tasks.

TERMINOLOGY

It is well known that the word “robot” was coined by Karel Capek in 1921 for a theatre play dealing with cybernetic workers, replacing humans in heavy work.

even in today life-time

robots are intended with a wide concern that includes any system that can operate autonomously for given class of tasks.

From technical viewpoint

In 1988 the International Standard Organization gives, [3]:

“An industrial robot is an automatic, servo-controlled, freely programmable, multipurpose manipulator, with several axes, for the handling of work pieces, tools or special devices. Variably programmed operations make possible the execution of a multiplicity of tasks”.

However, still in 1991

IFToMM gives its own definitions, [4]:

Robot as “Mechanical system under automatic control that performs operations such as handling and locomotion”; and Manipulator as “Device for gripping and controlled movements of objects”.

Even roboticists

use their own definitions for robots to emphasize some peculiarities, as for example from IEEE Community in 2000, [5]:

“a robot is a machine constructed as an assemblage of joined links so that they can be articulated into desired positions by a programmable controller and precision actuators to perform a variety of tasks”.

Nevertheless, a robot or robotic system can be recognized when it has the three main characteristics:
mechanical versatility, reprogramming capacity, and intelligent capability

Statistics for Robots

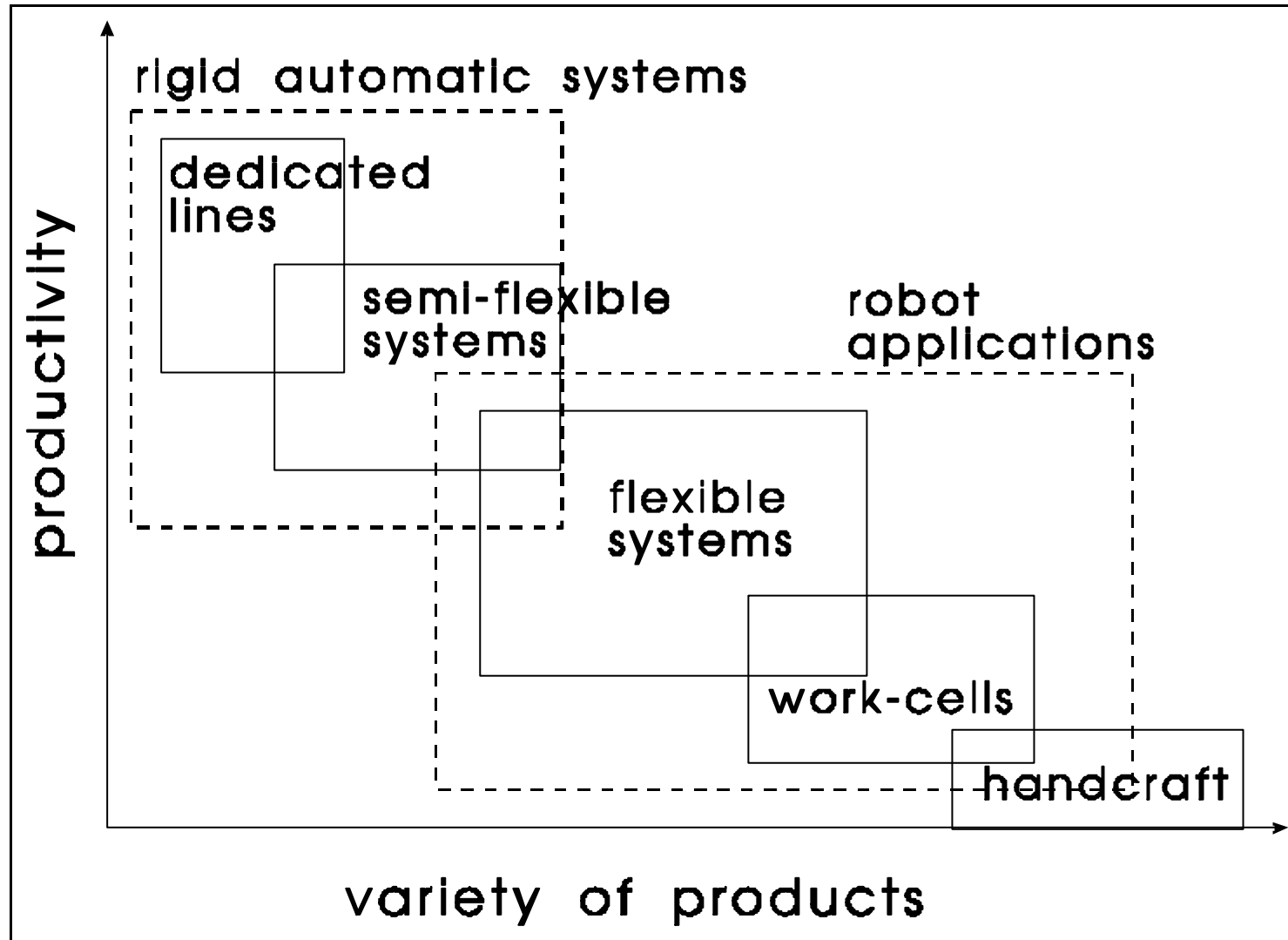


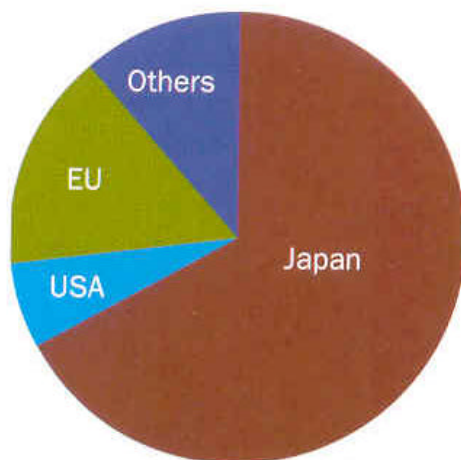
Fig.1.1: Variety of automatic and robotized systems as functions of the productivity level and product demand.

scesi del 9%. D'altra parte, si | negli Stati Uniti, vi era stato un

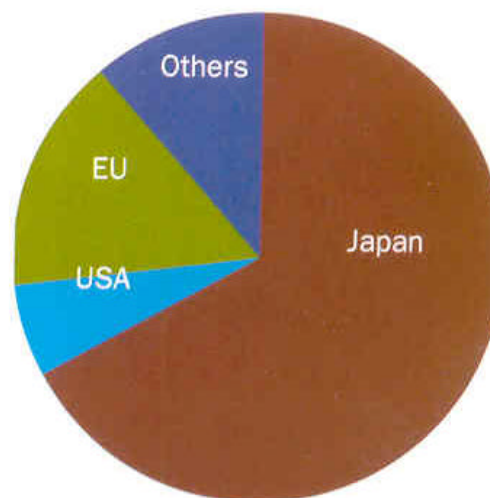
	Installazioni annue			Unità funzionanti alla fine dell'anno		
	Previsioni			Previsioni		
Paese	1999	2000	2003	1999	2000	2003
Giappone (tutti i tipi di robot)	35.609	37.400	47.500	402.200	381.900	384.700
Stati Uniti	15.063	15.800	24.000	92.900	105.100	155.400
Unione Europea	25.087	27.100	37.400	176.200	195.700	262.300
Germania	10.548	11.000	13.000	81.200	89.400	109.500
Italia	5.224	6.000	9.500	35.000	39.300	57.600
Francia	3.092	3.100	4.700	18.200	20.000	28.200
Regno Unito	1.392	1.400	1.700	11.500	12.200	14.900
Austria	350			3.000		
Benelux	1.059			7.800		
Danimarca	253			1.200		
Finlandia	435			2.300		
Spagna	2.112			10.500		
Svezia	622			5.600		
Altri Paesi Europei	1.201	1.300	2.000	17.000	16.700	14.700
Rep. Ceca	100			1.300		
Ungheria	20			200		
Norvegia	57			500		
Polonia	42			500		
Fed. Russa	500			10.000		
Slovacchia	30			600		
Slovenia	20			300		
Svizzera	432			3.600		
Asia/Australia	4.056	4.700	8.000	48.200	51.800	67.300
Australia	383			2.900		
Rep. di Corea	2.426			33.700		
Singapore	500			5.300		
Taiwan P. of. C.	747			6.400		
Altri Paesi	492	600	1.000	6.000	6.400	7.800
Subtotale escluso Giappone	45.900	49.500	72.400	340.200	375.500	507.500
Totale incluso Giappone	81.500	86.900	119.900	742.500	757.600	892.200

Fonte: ECE, IFR and national robot associations

1989 total 64 690

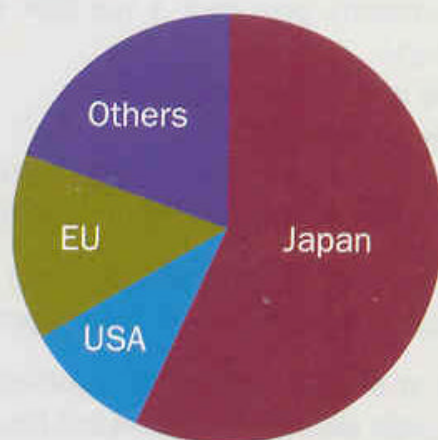


1999 total 81 508

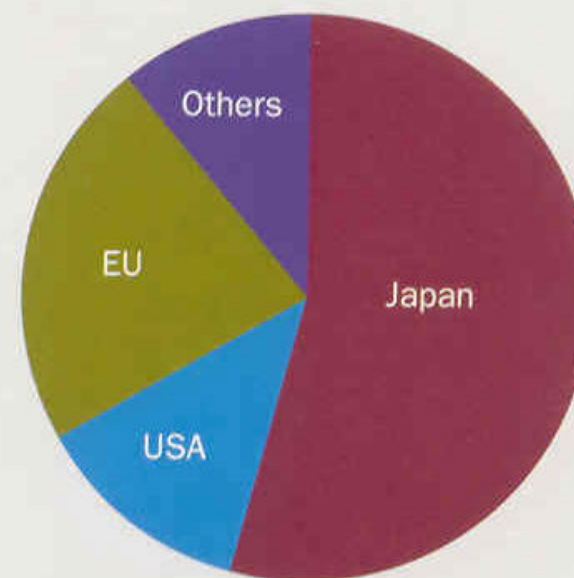


new installations

1989 total 386 572



1999 total 742 500



stocks

1999

**Estimated stock of multi-purpose
robots installed world-wide,
divided per application**

