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ELECTRONICS INDUSTRY

REPORT

PREPARED FOR

TUNISIA

BY

SIMPSON ASSOCIATES LIMITED

To profit from the arrival of multi-nationals intent on achieving the lowest costs of production, a country must develop the educational and professional infrastructure and must provide incentives for the foreign company to invest in local R & D activities.

A good way forward is to substitute locally produced components for imported components.

The basis for most electronic product assembly is normally the printed wiring board or printed circuit board (PCB). A small factory to make boards is relatively easy to establish and represents a considerable part of the added value. Metal enclosures, cable forms, transformers and keyboards are all suitable items on which to build the business.

The actual assembly process may be manual or it may be automated. Either way, local companies can rapidly acquire the know how and skills to sub-contract "board stuffing" assembly , inspection and test of even very complex products.

To consolidate the growth of the electronics industry in any given country, there must be a long range plan to supply engineering graduates of high calibre for hardware, software and systems design.

There must also be appropriate management training at college and university level.

Training and technology transfer packages are available from experienced consultants who have successfully set up electronics operations in diverse locations.

Electronics Industry - Infrastructure

"Electronics" has become an essential feature of modern life.
Radio, Television, telephone, computers, Fax machines, copiers,
cash dispensers, printers, radar, navigation aids.... the list
goes on. The communications and information technology markets
are among the fastest growing in the world.

The basic building bricks of all electronic products and systems
are based on sophisticated technologies and components. For
example -

> Semi-conductor design and fabrication
> Copper clad epoxy/glass laminates
> Ferrites
> Optical Fibres
> Cathode Ray Tubes
> Microwave Tubes and Passive Components
> Liquid Crystal Displays
> Thin Film Process
> Software

Most of the state of the art sources for these and other essential
components and technologies are centered in Japan, USA, EEC and
Scandinavia. Taiwan, Korea, Singapore and Hong Kong are also making
great progress. Given the components, however, most competent elect-
ronic engineers could design and build a radio set or T.V. set today.
The assembly of even very complex products, such as personal computers,
electronic telephone exchanges or copying machines can be learned
quickly by a semi-skilled, intelligent workforce, assuming transfer
of know-how and adequate training.

For industrially underdeveloped countries who want to build an elect-
ronics industry base, there are several tried and tested routes,
depending on the initial starting conditions.

1. Scotland

> A country of 5 million people with a long history of
> industrialization and an ancient tradition of university
> education. James Clark Maxwell, Napier, Watt, Bell,
> Baird, Watson-Watt were all pre-eminent in leading
> mathematical and engineering innovations.

Scotland Continued

In making the transition from the age of steam,
shipbuilding, coal mining, jute weaving, etc. to
electronics, Scotland could call upon the graduates
from seven technical universities and the chemical
and engineering skills of heavy industry.

It was World War II, however, that sparked the
intensive development of·electronics in Scotland.
An English company, Ferranti, was asked by the
Government to build military radar and navigational
equipment in Edinburgh in 1946 and this company
really spawned the industry.

In the 1950's, a Scottish Council for Industry was
established to attract investment by American·elect-
ronic companys and this was extremely successful.

NCR, IBM, Burroughs, Hewlett-Packard, Hughes, Motorola
all moved major operations into Scotland in the 1950's
and 1960's. Later, the Scottish Development Agency
(SDA) took on this task and have continued this success-
ful trend in the 1980's with Compaq, SCI, National Semi,
Burr-Brown, Bourns from the USA and NEC, OKI, Mitsubishi,
Shin-Etsu and many others from Japan. Today, over
45,000 people are directly employed in Electronics in
Scotland, with a flourishing sub-contracting industry
as well. (Over £5.0 billion in total).

2.   ## Malaysia

By contrast, Malaysia in the 1960's was building it's
first trunk roads and was highly dependent on rubber
plantations and palm oil. A UK electronic company
that I was with at that time, with a factory in Kuala
Lumpur, turned to selling petrol pumps and rice boilers
to supplement it's income, since there was very little
interest in sophisticated electronic products.

However, with a hard working low cost work force and
enlightened government financial support, the labor in-
tensive parts of the U.S. and European Electronics in-
dustry started to set up assembly plants in K.L. and
Penang. Initially, these factories assembled core
memories for computers and today, there is a major
industry assembling integrated circuits with Motorola,
National, Hewlett Packard, Intel and many other multi-
nationals.

COMPLETE LIST OF UNIDO ARAB ELECTRONIC PROJECTS

David Simpson
March 1990

COUNTRY – EGYPT (8 Projects)

Ref.	Project	Sponsor	Possible Partner(s)
E1	Colour TV Tubes	El Nasr	Goldstar, Thomson
E2	Printed Circuits	El Nasr	Prestwick Circuits
E3	Interconnection	National Engineering	SCI, Albacom
E4	TV Set Components (6)	El Nasr	Goldstarm Samsung
E5	UPS	National Engineering	Edison, Domain
E6	PABX	A.O.I.	GPT, Ericsson
E7	Printer	The Arab Co.	OKI, NEC
E8	Computer Fans	National Engineering	Scotfan Ltd.

COUNTRY – ALGERIA (8 Projects)

A1	Colour TV Tubes	ENIE	Samsung, Toshiba
A2	PC Boards	ENIE	Prestwick Circuits
A3	Interconnection	A. Brahim Benjaber	SCI, Albacom
A4	Computers & Peripherals	Societe Mahgrebine	Olivetti, IBM
A5	Semiconductors	ENIE	ES2
A6	Modems	ENIE	Alcatel
A7	Radio Comm.	ENIE	Racal
A8	UPS	Astein Industries	Emerson, Domain

COUNTRY – IRAQ (8 Projects)

I1	PC Boards		
I2	Printers	EIC or Sghaier	OKI, NEC
I3	Integrated Circuits	EIC	ES2
I4	Control Systems	Iraqi Control Systems	Stanley, Bradley
I5	Colour TV tubes	EIC	Thomson, Goldstar
I6	PABX	EIC	Allcatel
I7	Tantalum Caps	EIC	Nicholson
I8	Interconnection	National Electrical Inds.	SCI, Albacom

COUNTRY – TUNISIA (5 Projects)

T1	Radio Comms.	T T E	Thomson
T2	PABX	Arabtel	BPT, Alcatel
T3	UPS	Arabtel	Domain
T4	PC Boards	TTE	Prestwick Circuits
T5	Interconnection	Ayari	SCI, Albacom

COUNTRY – MOROCCO (3 Projects)

M1	Interconnection	STEM	Albacom
M2	Assembly of IC's	Casa Intl.	Motorola
M3	PC Boards	DPI	Prestwick

COUNTRY – SAUDI ARABIA (1 Project)

S1	Computers	Saudi Computer Inds.	Sinclair