

## Chapter 1

### 1. Introduction.

Many nations of the world emphasize industrialization as the main path for economic growth and development. Technology provides the essential dynamism for the industrialization process. Success in industrialization, however, is observed to be dependent on the availability of the required technology and the capability to use technology effectively (Sharif, 1986) Thus, most countries face set-backs to their efforts towards development due to the non-availability of relevant indigenous technology. Many countries emphasize the “Technology Transfer” (TT) as a rational way for achieving rapid technological advancement.

To undertake a study of the technology transfer process, we must first of all understand the concept of technology. In Chapter 2, the concept of technology is presented by studying its various definitions. Different types of technology are described and the technology itself is split into its components. Due to the globalization nowadays, technology is central for the development process of any country that is why technology transfer is needed. The concept of technology transfer is defined in different contexts and the main elements, channels and types of technology transfer and the stages of the TT process are presented.

In Chapter 3, the whole situation of TT is landed for Mexico by describing the structural ways for TT in Mexico. Three TT Models found in the literature are discussed

and the key factors in the transfer of technology are identified. Typical barriers and difficulties found in the transfer process are mentioned.

In order to propose a TT model suited for the Automotive Industry in Mexico, in Chapter 4, this industry is carefully described and its structure is pointed out. After doing this, the actual TT Model for the Mexican Automotive Industry is suggested and its elements illustrated. The elements of the model include: needs assessment, sociocultural and environmental factors, types of technology used in the Automotive Industry, economic and financial resources, timing of the transfer, education, training and human resources, research centers and institutions, target groups (such as change agents and opinion leaders), government, politics and infrastructure.

The objective of developing a case study in the Mexican Automotive Industry is to illustrate the process of technology transfer in real companies and to give some examples of the many advantages of TT and the difficulties encountered during the process. To illustrate the latter a laser welding process has been chosen. In Chapter 5 a brief history of lasers is given, together with some basic laser principles, a general classification of lasers and a specific report of the types of lasers used for welding operations. Laser Weldability, laser welding defects and laser welding considerations are pointed out. The advantages of laser welding are argued, many of which are in the actual manufacturing process, due to the reduction in throughput time. These include faster weld rate and the ease of automation of the process. After all these considerations the need of laser welding in the Automotive Industry was identified. The engineering case study was developed in company "X". Company "X" is a subsidiary of a big German vehicular firm within the assembly plant

segment. A general background of the firm is given, accompanied by the equipment, tooling and material specifications for the laser welding process. The technology transfer process itself is exemplified, with its problems and success encountered. A complementary example of laser welding application within the Mexican Autoparts Industry is shown.

The objective of Chapter 6 is to contrast the TT model proposed with the information obtained in the case study and see if the model exemplifies the reality of the TT process in Mexico. It was tried to decompose the laser welding technology in core technology and region-specific technology. All elements of each stage of the proposed TT model were extensively analyzed for the specific case of company “X” and at the end of the chapter summarized. Although every stage of the TT process has its own issues and barriers, the general barriers involved in the TT process are mentioned in an overall view and some modifications to the original TT model were made, after the analysis made from the information obtained from the research in a real automotive company operating in Mexico.

Finally, a series of conclusions and recommendations are issued in Chapter 7, based on the argument that technology must consider some fundamental aspects, such as cultural, social, economic, educational and political aspects. All this aspects must be evaluated from the beginning of any technological development. Particularly the cultural aspect should be taken as a central issue; or damages, losses and failure could arise.