

3.3. Development Direction and Promising Products

3.3.1. Electric and Electronics Industry

(1) Development Direction

There are some preconditions that must be taken into consideration when we try to sketch within the limitation of obtained data and information the development direction of Electric/Electronics Industry of Armenia. Those are in the extremely depressed situation of the industry under which most of the enterprises have been shut down or operated less than 10% of the production capacity and they have not yet build up their clear visions for the future business activities. Consequently, it is important to visualize the development direction through a practical approach of assessing possibilities dividing into a short-term and a mid/long-term according to the passage of time for the future.

The factor of viability for success is also important. The following conditions must be carefully checked:

- Production experience of the product in question and the current state of the production line
- Availability of raw materials including imports
- Difficulty in transportation of the product
- Securing competent human resources

It is desirable if a proposed development program would contribute to the Armenian economy with a big impact. From this viewpoint one should check the following regarding the product in question:

- Size of the domestic market or export potential
- Growth potential in the future

Hereunder made is an observation of the Study Team on the direction of development in consideration of the foregoing preconditions and viewpoints:

- a) Products under the Short-term target based on production experience in hand
 - Having markets in neighboring countries as well as in Armenia and can be produced by the existing facilities
 - Production system can be deployed with minor reinforcement of production experience, materials procurement, securing of workers, equipment and facilities, etc.
- b) Projects to be studied from the mid/long-term viewpoint
 - Having high growth potential

- Starting up a high-tech business through a joint program with foreign firm(s)
- Realization of research accomplishments of SRIs/universities as new business or products

(2) Promising Products

1) Products under the Short-term Target based on Production Experience in Hand

a) PCB

There are only 2 manufacturers in Armenia on a small scale: Sirius and Mars. Their facilities are outdated and technology is at low level compared with world level. Their main products are single and double layer PCBs while world can produce 30 layers as commercial products. However, Armenian manufacturers have production lines to complete final products and are capable of conducting pattern design of PCBs. As PCBs are custom-ordered products and the specification requirements (whether the latest technology or conventional) are determined by the orderer, Armenian manufacturers may have room that they can still enjoy PCB business as far as the orders are placed with them by the clientele. In the above case the best answering suppliers closely located to the customers may have obvious advantage over the strong competitors in distance. They should make shortest TAT based on their geographical advantage as their strength. But, in case a customer from the neighboring region would not be of much interest in TAT, then they need to offer all-around services including design support as described in section 3.2.1.(2) as well as a competitive price.

b) Resistor

Sirius is the only manufacturer of resistors in the neighboring markets of Caucasus and Middle East, though the production has been stopping since 1993. However, as a result of the T/A rendered by the Study Team the whole organization of Sirius was activated and the company succeeded in obtaining fresh orders. The production of resistors has been resumed since July, 1999. Resistors are the commodity item; however, in the initial stages of the resumption custom-ordered production is recommended. The company can fully utilize the advantage of short TAT to the customers of the neighboring regions as in the case of PCB.

c) Spare Parts for Conventional Electric/Electronics Products

The Armenian electric/electronics industry used to supply about 30% of high-tech apparatus and spare parts in the FSU. Those are supposedly being used though not being fully utilized. There are some demands for the spare parts, if not for most of the apparatus sold, which cannot be handled for the need of current users by manufacturers from any other countries than Armenia. The Study Team suggests that a precise search of the demands is to be made by the Armenian electric/electronics industry and a plan for the execution of spare parts business should be

formulated upon the evaluation of production scale and profit calculation based on the obtained information. This approach is worth while trying. For the execution of spare parts production, the manufacturers should pursuit profit by increasing productivity as well as by saving manufacturing costs with a scale downed operations.

2) Projects to be Studied from the Mid/long-term Viewpoint

a) Small Hydro Power Plant

Table 3.3.1.1 shows Armenia's distribution of power supply by type of generation. Currently supply is well covering demand. Increase of power supply will be needed as industrial activities increase. It is fundamental requirement to reinforce power supply system that can secure a low priced and stable supply of power to the population, as its life depends on power.

Table3.3.1.1 Power Supply in Armenia

	Capacity(MW)	Cost(U.S. Cent/kW)
Hydropower	1,000	0.3
Nuclear	300	1.3
Thermal	700	4

The features of power supply in Armenia are as follows:

- Hydropower is the lowest in cost of generation.
- It does not require importation of raw materials.
- It can adjust volume of generation by controlling the level of water when demand is low.
- It is a clean energy and less dangerous in comparison with nuke and thermal power plants.

According to the research of Andron institute of complex electro-technical equipment, the detected sites that suit for small hydro power generation of 100 kW to several megawatt in capacity are around 300 in Armenia, totaling 450 MW. In consideration of seasonal utilization limitation of water to be affected by climate, complementing power generation is required by thermal plant for a stabilized supply.

It is required that the national investment policy for the construction of Small Hydro Power Plant is to be drawn as this would become long-term project having a nature of long recovery period of initial investment as indicated in Fig. 3.3.1.1.

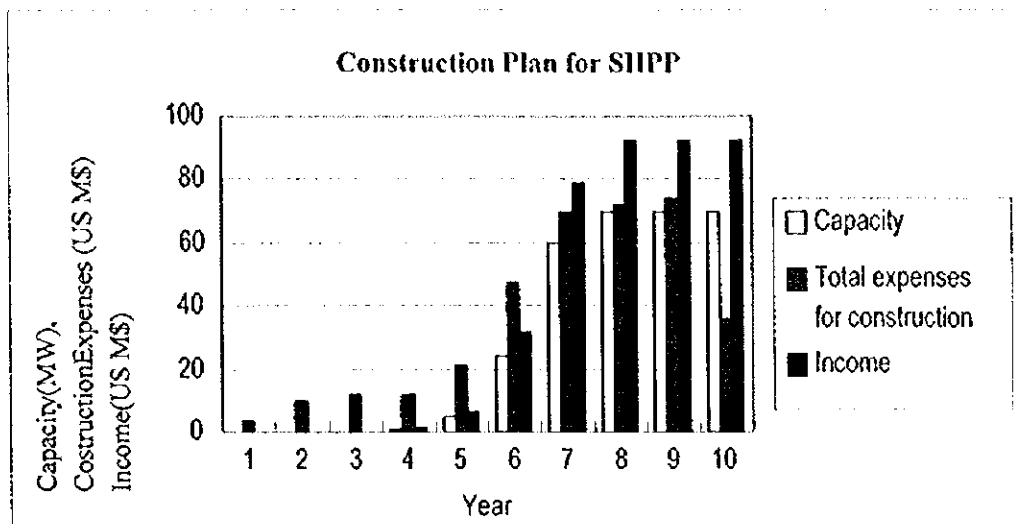


Fig. 3.3.1.1 Calculation for Small Hydro Power Plant Operation

b) LSI Design Center

It may not be sufficient to develop manufacturing industries in Armenia and ultimately to give a big impact to the country's economy only with the enhancement of promising products that the electric/electronics industry has in hand. Accordingly, the fostering of high-tech industry, e.g. the semiconductor device industry, should be considered. The semiconductor devices will not be much affected by high transportation costs the Armenian industries are currently suffering, as they are high added value products.

The semiconductor devices are necessities for the electronic equipment either for household or industrial use. As far as there are equipment manufacturers in the CIS and other neighboring countries, the demand for semiconductor devices exist. Even if the market didn't appear to exist there, the potentiality would be big. The electronic equipment of FSU is composed of undeveloped components and parts, especially they are falling behind with respect to the integration by LSI from the level the world. We would foresee that the integration demand from CIS clientele would increase.

In order to cope with this demand, the Armenian electronics firms will have to increase number of LSI design engineers. Because, there is a tendency that a number of different kinds will be in use when the scale of LSI utilization has become enlarged. LSI designing doesn't require much money compared to the production of semiconductor devices. As most part of the designing is composed by the cost of work carried out by human resources, the Armenia is quite competitive with its less expensive cost of human resources.

The flow of LSI development including the role of LSI design center, production and supply is shown in Fig. 3.3.1.2 requiring the following significant factors:

- Young specialists having expertise in electronic circuit or potential
- Formation of transaction channel with electronic equipment manufacturers in the neighboring countries as well as in Armenia
- Collaboration with LSI maker as being Silicon Foundry

For the Armenian electronics industry intending to enter into the field of LSI business, LSI design is an appropriate sphere as the industry can secure the competent human resources.

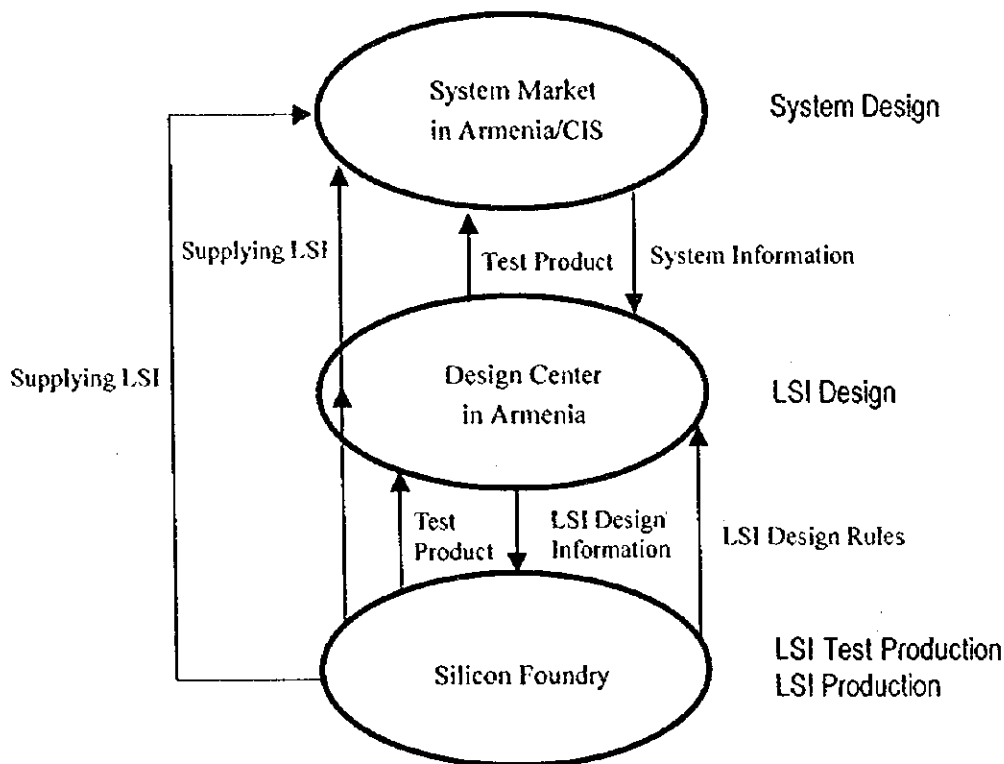


Fig.3.3.1.2 Role of LSI Design Center

c) Production of Semiconductor Device

As the designing of LSI stated above is the work of the resources and has less added value, its impact to the country's economy is not big (we haven't included high technical level LSI designing works to be executed in the next stage of development that would eventually lead to generate high added value.).

Accordingly, it would be desirable for the Armenian electronics industry to undertake the production of semiconductor devices, if they wish to expand the amount of sales and to create number of jobs. The production would become profitable only when mass volume sales as the line of business is classified as equipment industry. And, the key factors for the production are capabilities in high-levelled technology and financing. It is hardly possible to start this business

without any experience in the past. Therefore, the Armenian companies need to seek opportunities to form a joint venture with world-class firm(s). For such purpose, they need to have some attractiveness to perspective foreign partner:

- Competent engineers
- Low cost workforce
- Large markets in the neighboring countries as well as in Armenia
- Stable operating records of the company
- Incentives for foreign investments

The Armenian enterprises should enhance their technology level as well as financial foundation through the actual business experience. Excellent engineers are available in Armenia. If the industry for which they can exert their ability is fostered by the government with proper financial support, a solid base for the above stated joint venture is brought about.

As described in section 3.1.3.(5), U.S. firm, Interfoundry is to make investment in Transistor's Ashtarak Plant. This will facilitate the opportunities of semiconductor device production for the Armenian electronics industry.

d) Realization of Research Accomplishments of SRIs/Universities as New Business or Products

Currently there are no research accomplishments of SRIs/universities that can be utilized as seeds of new business or products. Most of the basic study by SRIs/universities has low possibility to be realized as new products. Nevertheless, we provided this sub-section here, as we felt that many of studies made by the Armenian scholars had uniqueness in conception that were scarce in other countries.

The Study Team strongly suggests that both of the industry and SRI spheres will make a forum where they can exchange information towards the development of technology orienting from Armenia.

3.3.2. Machinery Industry

(1) Development Direction

1) To act under common recognition that improvement of machine processing technology is useful for all manufacturing industries

From the above stated character of machine processing technology, the machinery related industry might find some demand in the domestic market.

The government officials as well as the managers of enterprises connected with the machinery industry are required to carry out their mission and duty with the understanding not only to benefit

them but also to contribute to re-building of Armenian industry.

2) To Improve Machine Processing Technology

Machine processing technology is fundamental for all industries in giving influence on the performance, quality and cost of all industrial products. As a result of the Study Team's Quick Survey of the enterprises, it has been made clear that the government is asked to take an initiative to promote improvement of machine processing technology and research and development of new technology. The effect of the promotion is to benefit the private sector through the eventual transfer to the relevant private enterprises and ultimately to all spheres of industry.

3) To build up networks of enterprises having specialty for effective utilization of technology resources of machinery

As described in section 3.2.2.(1), many of the enterprises possess an in-house integrated processing system from raw materials to final assembling. This system is extremely inefficient for flexible production to suit market oriented economy, particularly for the production on SME scale.

There is a need to organize systems to effectively utilize the technology resources of the machinery industry. One of those system is called clusters and networks in which independent but interdependent SMEs are to promote the effective utilization of technology as the whole sector through optimal division of labor by respective enterprises, while each enterprise is to retain a competing relation with other enterprise, rather than the specialized technology being dispersed by individual enterprise only for their own use.

(2) Promising Products

The promising products that are typical to and representing the Machinery Sub-Sector were not found. However, businesses of this Sub-Sector should be promoted, based on the recognition of fundamental nature of machine processing technology as referred to in the above item (1). There is a need to grasp each process of machine processing technology as an independent business such as metal cutting, forming, molding and finishing. The supply of services for each of these processes can become an independent business.

The enterprises focusing their efforts on specific line of products, which fall under the category of applied or derivative area of machine building technology, are Hi Team (for steel furniture, aluminum structure, kiosk, etc.), Mshak (for CNC and motion control equipment) and Autogenmash (for unique welding devices). They start manifesting success in their respective field of business, though their operations are not on a large scale.

Joint development program by the government with foreign firm(s) may be effective for the development of the Machinery Sub-Sector on a large scale. It may also provide the related manufacturers business opportunities including sub-contract.

3.3.3. Chemical (Pharmacy) Industry

(I) Development Direction

1) Overview

Most existing factories in both chemical and pharmacy industry have been shutdown or at low level of production for a long time. Especially, when operation has once stopped, the company's management needs to devise any ways of reconstruction focusing on its technological level of chemical or pharmacy industry (as the case may be), not on existing facility.

2) Chemical

Revival of the Armenian chemical industry is very difficult due to the following reasons:

- a) Raw material such as crude oil and natural gas cannot be procured domestically.
- b) Domestic market is very small. Export of goods is hindered by high transportation cost.
- c) Production facilities are worn out; shutdown of facilities for a long time have caused bad maintenance.
- d) Most chemical factories are located in the City of Yerevan. If these factories recover their production substantially, serious environmental issues might be caused.
- e) Chemical factories in Armenia are not interrelated much with each other. In addition, some interrelation that used to exist during the Soviet era was lost due to the economic confusion after independence. For example, "Polyvinyl Acetate" used to purchase raw materials (acetic acid and acetylene) from "Nairit". However, they now consider importing semi-finished products (vinyl acetate) from Russia for its production since high price offered by "Nairit" would adversely affect the profitability of their product.

Under such circumstances, possibility of reconstruction of chemical industry would be found in the followings:

a) Cooperation with Supplier(s) of Raw Material

The most important issue for the Armenian chemical industry is stable procurement of raw material. Cooperation with suppliers of raw materials could lead to a possible means of revival. A Buyer of two chemical enterprises ("Vanadzor Chemical Factory" and "Chemical Fiber Factory") is "Prometey", a supplier of natural gas. Doghagorts have cooperated with an Iranian company that can supply raw materials.

b) Establishment of Network among Chemical Factories

We recommend considering the possibility of providing semi-finished products for other Armenian enterprises using existing facilities in Armenia. If revival of "Nairit" is possible, it is

recommended to consider the possibility of operating "Nairit", which can produce various chemical products, and other chemical enterprises as one chemical combinat.

c) Conversion of Products

We recommend considering production of new products using existing facility and raw material that can procure domestically. See for concrete recommendation in (2).

3) Pharmacy

Pharmaceutical factories of FSU, which do not comply with GMP, have little possibility to export their goods to the countries other than CIS countries. In addition, because recently new drug law to oblige pharmaceutical producers to comply with GMP was ratified in Armenia, the pharmaceutical producers not complying with GMP will become difficult to sell products even in Armenia and CIS countries in the near future. At present, there are two pharmaceutical enterprises that consider GMP compliance in Armenia. They started export to the neighboring CIS countries such as Georgia and Russia. Because most enterprises in other CIS countries seems not to have taken necessary steps for GMP, if the Armenian enterprises take care of GMP earlier than those in other CIS countries, we think that they can take better competitive position. Armenia should take necessary steps for its pharmacy industry to comply with GMP. Although new drug law including GMP was ratified in Armenia, detail implementation guidance has not yet been made. Therefore, Armenian pharmaceutical producers cannot decide how to deal with it. It is necessary to make implementation guidance in order to push pharmacy industry to take earlier steps to enhance its competitiveness. Further, in order to comply with GMP, scrap-and-build of facility will be required in most cases. Any financial supports or tax incentives for it should be worth devising.

In addition, since Armenia has many biotechnological research institutes with high levels of study, industrialization of such studies would be promising. In the case of pharmaceutical industry, new products can be developed based on such technological studies.

(2) Promising Products

1) Chemical Industry

a) Nairit

Although most popular products among the Armenian chemical industry have lost competitiveness, chloroprene rubber produced in Nairit has some relative possibility. In addition, since the company is very large in scale and produces wide range of chemical products, its revival would influences to other chemical enterprises in Armenia very much. The company was the only factory to produce chloroprene rubber in the Soviet Union and produced three fourths of the demand in the Soviet Union (about 75,000 ton per year). Its production in 1998 was 4,000 ton,

which is about 5% of its capacity. But production level has recovered to 10-12 % in the first couple of months in 1999.

Current market of the company is mainly Russia. It offered 30-40 % cheaper prices (US\$2,100 per ton) than its competitor to ensure volume of sales. This would show it has lost competitiveness in the Russian market with respect to quality. Recoverability of the company relies on whether it takes a superior position in terms of production cost.

"Nairit" considered using butadiene as raw material in stead of natural gas in order to decrease cost. The "annual production plan" that it prepared says that annual income would be US\$20 million, presuming the price of butadiene is US\$350 per ton, sales price of chloroprene rubber is US\$2,100 per ton and annual production volume is 25,000 ton. However, the plan should be considered deliberately because realization of the plan, such as sales and production cost is uncertain. For example, one of the by-products, caustic soda is difficult to be produced with the new electricity price. In addition, by-products whose price is low can be sold only in Armenia and Caucasian countries due to transportation charges. If the market for that by-product in Armenia and neighboring countries is not large enough, the plan will not succeed.

In addition, the Company is located in the City of Yerevan. It should consider deliberately possible effects on the environment if production increases to 20-30 % of its capacity.

b) Products Using Domestic Materials

Products using raw materials that can be procured in Armenia, i.e., production of filters using perlite and production of cement can be considered. One example; currently perlite is exported as a material, thus it would be possible to produce filters without advanced processing technology.

If annual production of chloroprene rubber by Nairit could recover to 20,000-30,000 ton, industries using chloroprene rubber or other products produced by Nairit would have some possibility. Nairit has already produced construction materials produced from its chloroprene rubber.

(Note) Late July, 1999 the Study Team secured the information from international media that the Armenian government would soon finalize the treatment (disposition) for the future of Nairit which was imperative for normalization of Armenia's public finance, while pending for a long time. The above items a) and b) shall be subject to the upcoming government 's treatment.

2) Pharmacy Industry

Most actively operating companies in the pharmacy industry are those producing final products (bottling, packing, etc.), especially production of intravenous solution. This is because production cost becomes lower when importing pharmaceutical materials and packing or bottling them than

importing of drugs to Armenia or other FSU countries due to the lower labor costs. However, if they continue importing pharmaceutical medicine, added value will not become high. In the future, enterprises that provide with pharmaceutical material for producers of intravenous solution, which consider GMP would be promising. Production of pharmaceutical amino acids described in (3) is one of a representative example.

(3) Proposal for Organizing an Amino Acid Production Industry

1) Reasons for Proposing of Production of Pharmaceutical Amino Acids

We propose that Armenia develops and organizes an amino acid production industry, which aims at producing pharmaceutical amino acids using biotechnology. We believe that the production of amino acids is an industry with exceptionally high potential in Armenia, taking into consideration current technology and the industrial situation in Armenia. We also believe that production of amino acids is one of the most potential exporting industries for Armenia where transportation measures are very limited.

More concrete reasons for proposing the production of pharmaceutical amino acids are described as follows:

- a) Use of amino acids for pharmaceutical purposes has been growing rapidly in recent years. Demand for pharmaceutical amino acids is estimated to be around 4,600 ton annually. It is expected to grow rapidly since pharmacy producers are now actively developing mixtures of amino acids by disease type.
- b) Price of pharmaceutical amino acids, which varies based on composition of amino acids is high at some tens of US dollars per kilogram, thus being a promising export product for Armenia where transportation is very limited.
- c) Armenia has high levels of technical background in microbiology. Activities of Institutes of Biotechnology and Microbiology are closely related to the production of amino acids such that their technical background can give assistance to develop production of amino acids in the pharmaceutical area. In addition, there was the plan to produce pharmaceutical amino acids just before the collapse of the Soviet Union, and some production at pilot plants was performed.
- d) There are two pharmaceutical enterprises that are designed in accordance with the concept of GMP. Both of them currently sell products in Armenia and neighboring countries, but aims to export to European countries after obtaining GMP certificates. One of these two enterprises still purchases pharmaceutical amino acids mixtures and produces intravenous amino acid solutions on a pilot basis. The other enterprise has expressed its interest to produce intravenous amino acids solution. Production of amino acids in Armenia could contribute much into development of such

industry that manufactures pharmaceutical products. On the other hand, existence of such enterprises means that a producer of pharmaceutical amino acids still has potential buyers for its products in Armenia.

e) "Lizin" factory, which has stopped its operation due to the collapse of the Soviet Union followed by the economic confusion in Armenia, used to produce about 500 tons of feed crystal lysine annually. Although its production facilities will not be sufficient to produce amino acids for pharmaceutical use, some equipment such as ferment tanks can still be used. As for human resources, people who have experience in the production of lysine can easily be obtained from the current and past workers of the "Lizin" factory.

f) Pharmaceutical amino acids are high value-added products and suitable to Armenia where cheap raw materials in large volume cannot be easily obtained. "Lizin" factory used to purchase beet molasses from Russia and Ukraine and produce feed lysine. This route of procurement is not cost effective under the present circumstances where railroads are blockade in Georgia. This is one of the main reasons for the shutdown of the "Lizin" factory. However, when we consider producing pharmaceutical amino acids, cost of raw materials versus the price of product is low. Therefore, the fact that cheap raw material in large volumes cannot be easily obtained is not a significant obstacle.

Our proposal is aimed at producing pharmaceutical amino acids. Any plans to produce only feed lysine would seem unattractive to potential (foreign) investors for the following reasons:

- a) Due to limitations in the procurement of raw materials domestically, profitability is expected to be insufficient to attract foreign investors. Foreign investors will consider investing in other neighboring countries such as Egypt, Turkey, Iran etc. where they can procure cheaper sugar sources as raw materials.
- b) Transportation measures are very limited in Armenia. Only plans to produce high value-added products can attract foreign investors.

2) Factors Necessary

a) New Investments

Facility required in production of pharmaceutical amino acids is very different from that required in the production of feed amino acids. Because it should comply with GMP, the existing plant Lizin is not practical. It is more practical to construct a new plant and to use part of the equipment (e.g. ferment tanks) from the "Lizin" factory.

Total construction cost of a new plant for pharmaceutical amino acids is estimated at 40 million US\$ on the following conditions:

- Annual production: 300 - 500 ton
- Produce eight types of amino acids

- Environmental care due (drainage and exhaustion)
- Anti-frozen in winter time

b) Introduction of the Latest Technology and Training of Human Resources

It is most important to improve in productivity through introduction of microorganism with high yield in fermentation and improvement, and technology of evaporation and crystallization. In order to introduce such latest technology, it is essential to have strategic partnerships with a foreign enterprise that have a high level of technology in production of pharmaceutical amino acids. As for acceptance of new technology, Institute of Microbiology might mainly be in charge of improvement in microorganism used in fermentation and establishment of technology preserving such microorganism. Institute of Biotechnology should be in charge of improvement of technologies for evaporation and crystallization.

c) Development of New Markets, such as Europe and Near and Middle East

Expected markets are CIS, Near and Middle Eastern, and European countries. Major factories for pharmaceutical amino acids are in Japan, United States and China, but not in Europe. Target customers are producers of intravenous solution in Armenia and Europe. When we consider market development, trend of demand for intravenous solution of mixed amino acids was high. It is very helpful in developing new markets that there are producers of intravenous solutions in Armenia, which are interested in production of intravenous solution of amino acids.

d) Research and Development of Sugar Source as a Main Raw Material

It is more suitable for production of pharmaceutical amino acids to use imported crude sugar or domestically obtained potato starch as a main raw material because it requires high purity. The Institute of Microbiology has studied use of inulin extracted from topinambur to ferment amino acids. In the future, Armenia is expected to harvest topinambur and use it as a raw material. It would be practical to use imported crude sugar on the short term, to use potato (needs factory producing starch) in the middle term, and to use topinambur (needs harvesting it and factory producing inulin) in the long term.

3) Cooperation with Foreign Partners

In order to progress with this project, as described above, it is essential to have a strategic partnership with a foreign enterprise (Company A) that has a high level of technology in the production of pharmaceutical amino acids. Types of partnerships may be considered as follows:

- a) Company A establishes 100% own subsidiary in Armenia and introduces latest technologies.
- b) An enterprise to produce amino acids is established by investments of investor(s) (Company B: domestic or foreign) which has (have) interest in producing a pharmaceutical amino acids in Armenia. The enterprise introduces the latest technologies through technological

cooperation with Company A.

c) A joint venture of Company A and B form the business.

In order to perform smooth technological transfer, any investment by Company A would be welcomed. (Case a) or c)) In case b) or c), existence of investor(s) is expected. Producers of intravenous solution currently existing in Armenia would be considered as partial investors. Concept of the scheme of cooperation with a foreign enterprise is described as follow.

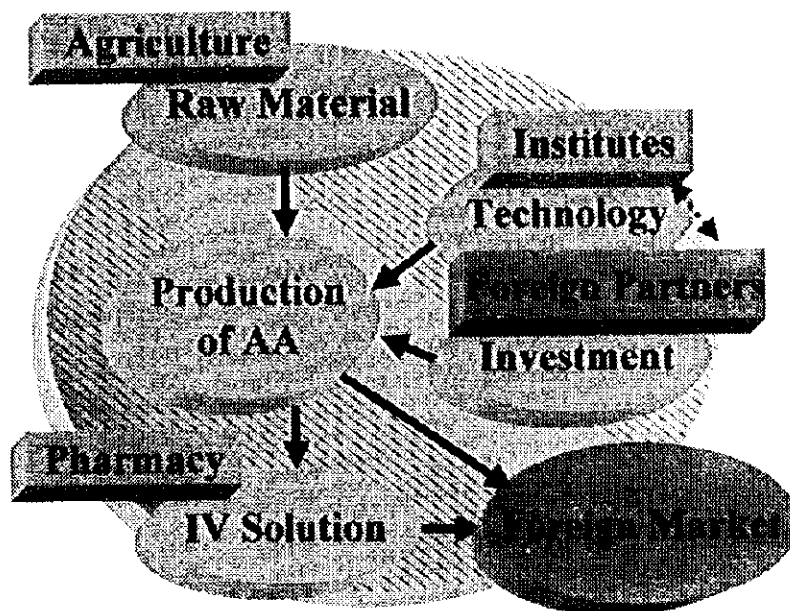


Figure 3.3.3.1 Framework of Production of Pharmaceutical Amino Acids by Cooperation with a Foreign Enterprise

4) Establishment of Cooperation among Domestic Related Parties

In order to attract foreign business partners, we believe that cooperation among industry, institutes and the government is necessary. The government should play an active role in the following areas:

- Establishing cooperation among related parties. In this case, the government should act as coordinator between the related parties in Armenia.
- Financial support should be provided to scientific institutes for related research, such as improvement of microorganism used in fermentation. Biotechnology is important field to reconstruct Armenian industry. Placing priority on the distribution of governmental budget for scientific research should be considered.
- Providing an attractive investment climate for foreign business partners. One example would be tax incentives to investment.

cooperation with Countries A
 (CVA) initiative of 3000 kg of AA (dry weight) per year.

In order to perform similar technology transfer activities with other countries, New York welcomed the use of an online database to examine the existence of existing or potential manufacturing solutions currently existing in America with the goal of identifying a possible concept of the scheme of cooperation with a foreign enterprise. The scheme is shown

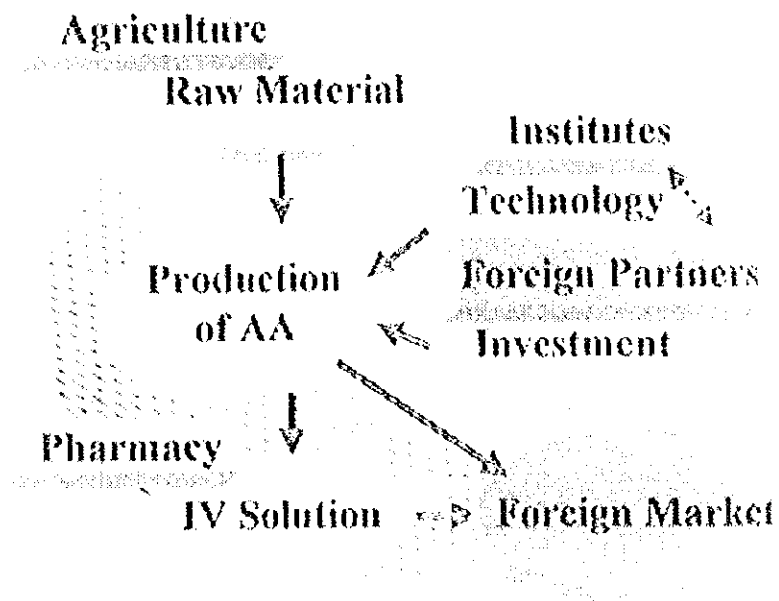


Figure 3.3.3.1 Framework of Production of Pharmaceutical Amino Acids (in Cooperation with a Foreign Enterprise)

4) Establishment of Cooperation among Domestic Related Parties

In order to attract foreign investment, the government should create an institutional framework to encourage investment in the pharmaceutical areas.

a) Establishing cooperation among related parties (between government and coordination between the related private industry).

b) Financial support should be provided to small and medium sized pharmaceutical improvement (United States based pharmaceutical companies). With the recent restructuring American pharmaceutical industry, many pharmaceutical companies have scientific research skills. However,

c) Providing an attractive investment climate for foreign investment in pharmaceuticals can be by incentives to investment.

Our concept is shown in the diagram below:

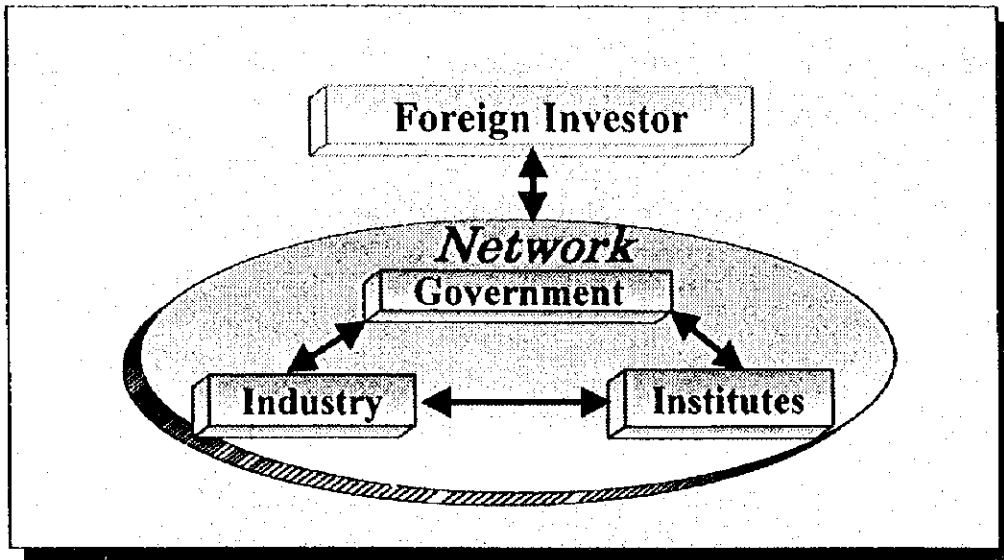


Fig. 3.3.3.2 Conceptual Framework of Cooperation among Related Parties Organizing an Amino Acid Production Industry

Within each related party (government, institute and industry), cooperation would be required.

For example, when domestic raw materials such as topinambur or potato are sought, cooperation between the Ministry of Agriculture and Ministry of Industry and Trade is important. Further cooperation between agricultural institutes and biotechnological institutes is important. When we look at cooperation among industries, the cooperation with the enterprises producing intravenous solution is important.

Our overall concept with respect to cooperation between each related party is shown below:

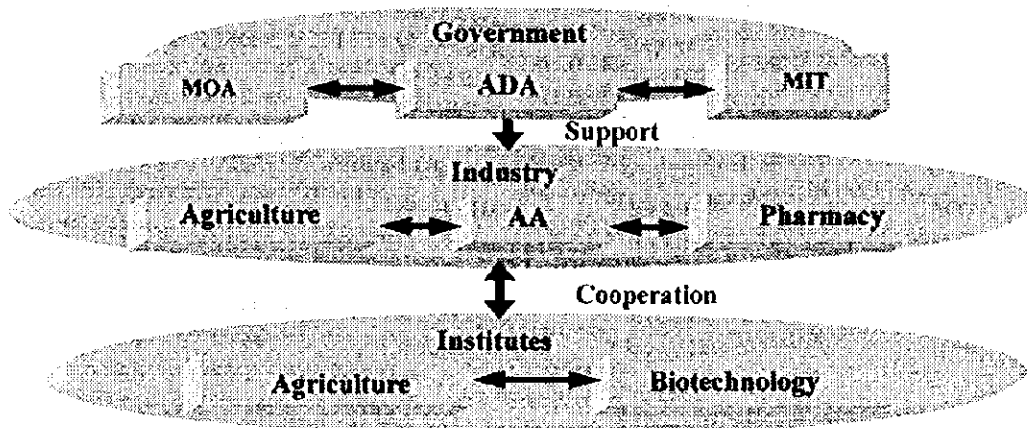


Fig. 3.3.3.3 Conceptual Framework of Cooperation

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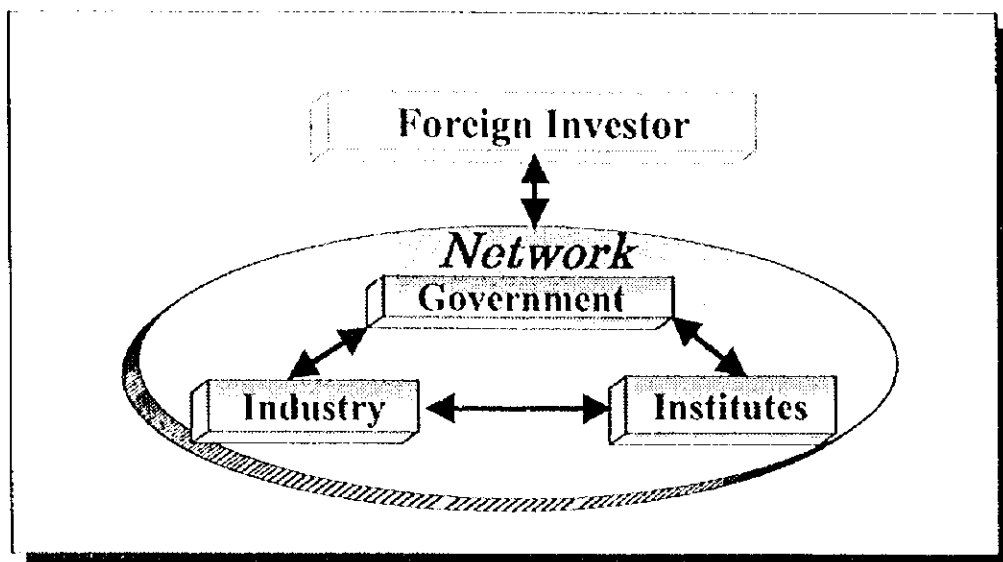


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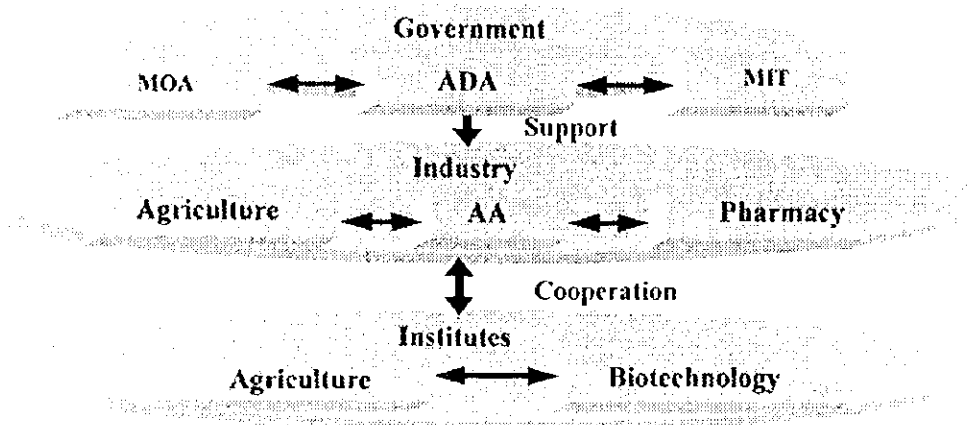


Fig. 3.3.3.3 Conceptual Framework of Cooperation

However, cooperation among government agencies, institutes or the industries themselves, can not be found currently. For example, presently the agricultural industry and agricultural institutes are under the control of the Ministry of Agriculture, and there exists little relation between agricultural institutes and biotechnological institutes who are under the control of the Ministry of Industry and Trade or another government agency. Even among biotechnological institutes, there is little relationship between the Institute of Biotechnology, which is under the control of the Ministry of Industry, and the Institute of Microbiology, which is under the control of the National Academy of Science. Cooperation between the above two biotechnological institutes may be illustrated as follows:

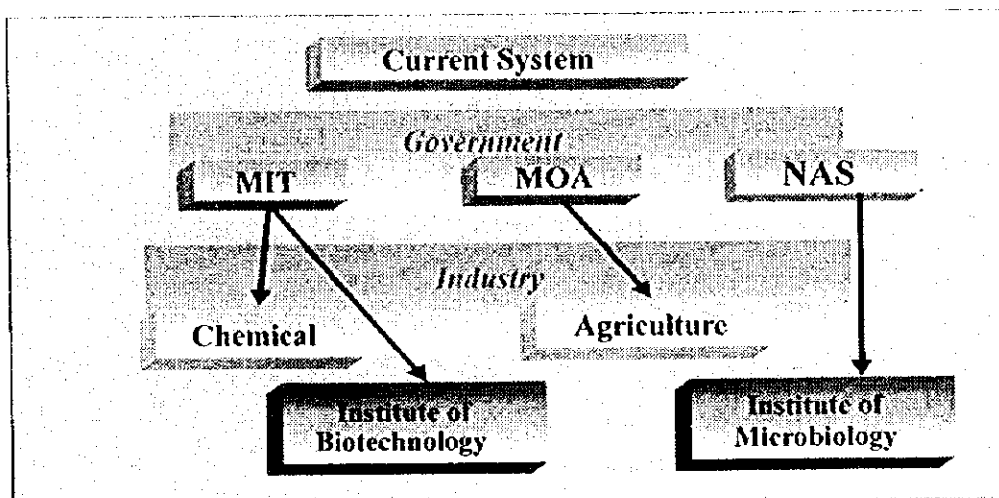


Fig. 3.3.3.4 Current Framework of Cooperation

5) Step by Step Approach

To achieve the final goal of this project, a huge amount of investment will be required. When an investor makes a decision of such a huge amount of investment, he needs deliberate consideration. It is expected that it will take a long time to reach a final decision. It is practical to proceed with this project step by step to minimize risk.

a) The First Step

Armenian manufactures of intravenous solution import pharmaceutical amino acids from their manufacture, which is expected to be a future partner, produce intravenous solution of mixed amino acids and exports them. Target of export would be CIS, Near and Middle Eastern, and European countries. Cost competitiveness would be questionable since they import raw materials and export products. However, they could compete in these markets considering the relatively lower labor costs in Armenia. There are no major factories producing pharmaceutical amino acids

However, cooperation among government agencies, institutes or the industries themselves, can not be found currently. For example, presently the agricultural industry and agricultural institutes are under the control of the Ministry of Agriculture, and there exists little relation between agricultural institutes and biotechnological institutes who are under the control of the Ministry of Industry and Trade or another government agency. Even among biotechnological institutes, there is little relationship between the Institute of Biotechnology, which is under the control of the Ministry of Industry, and the Institute of Microbiology, which is under the control of the National Academy of Science. Cooperation between the above two biotechnological institutes may be illustrated as follows:

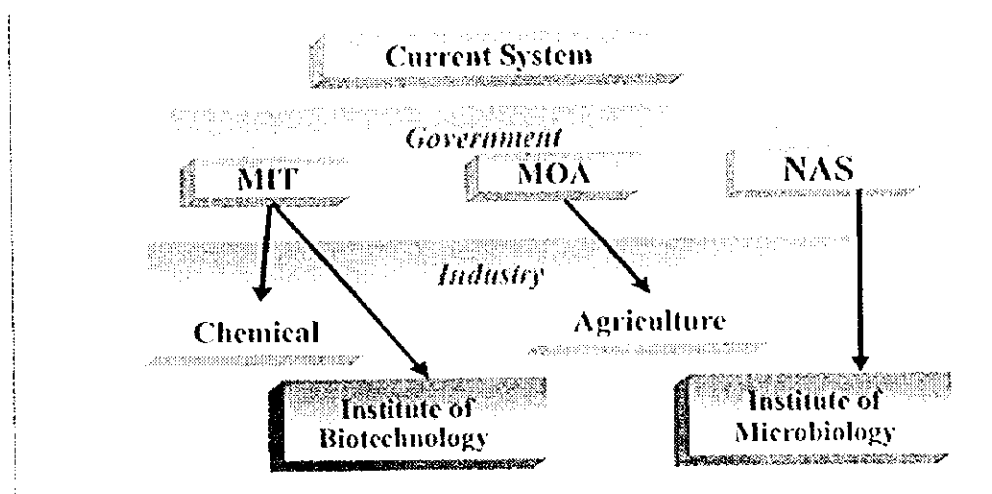


Fig. 3.3.3.4 Current Framework of Cooperation

5) Step by Step Approach

To achieve the final goal of this project, a huge amount of investment will be required. When an investor makes a decision of such a huge amount of investment, he needs deliberate consideration. It is expected that it will take a long time to reach a final decision. It is practical to proceed with this project step by step to minimize risk.

a) The First Step

Armenian manufactures of intravenous solution import pharmaceutical amino acids from their manufacture, which is expected to be a future partner, produce intravenous solution of mixed amino acids and exports them. Target of export would be CIS, Near and Middle Eastern, and European countries. Cost competitiveness would be questionable since they import raw materials and export products. However, they could compete in these markets considering the relatively lower labor costs in Armenia. There are no major factories producing pharmaceutical amino acids

in Europe or Near and Middle East and cost of raw materials is expected to be less than 5% of the price of the intravenous solution of mixed amino acids (generally US\$4 dollars per 250ml).

It is essential to obtain a GMP certificate to export to non-CIS countries. In Armenia, two intravenous solution manufactures have already taken necessary steps to obtain a GMP certificate.

Export to those countries would result in developing potential demands on pharmaceutical amino acids. As a result, it would be useful for foreign partners in making a decision of the investment.

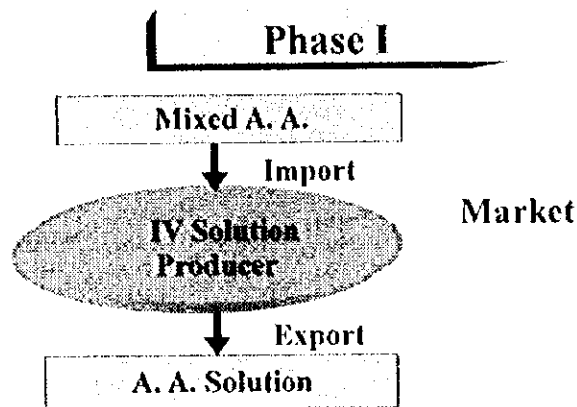


Fig. 3.3.3.5 Conceptual Framework of the First Step

b) The Second Step

It started some types of amino acids, which are technically easier to be produced. It still import other types of amino acids from the foreign partner and export mixed amino acids through intravenous solution manufactures in Armenia or directly to intravenous solution manufactures abroad.

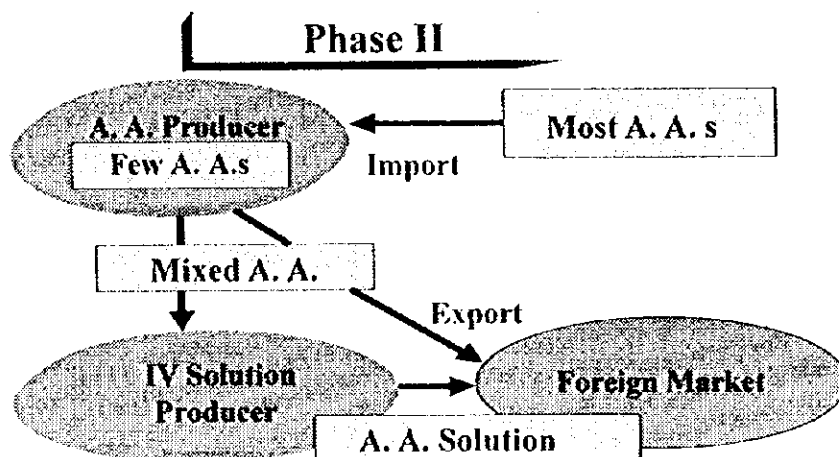


Fig. 3.3.3.6 Conceptual Framework of the Second Step

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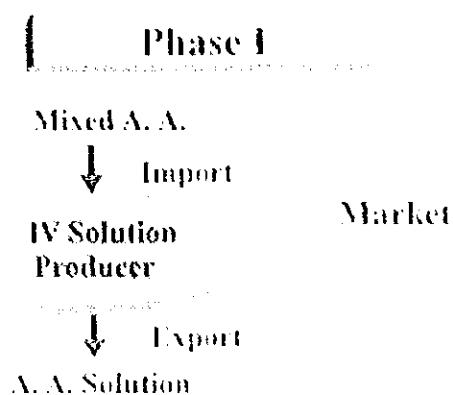


Fig. 3.3.3.5 Conceptual Framework of the First Step

b) The Second Step

It is necessary to export amino acids which are technically easier to be produced. It still imports a certain amount of amino acids from the foreign partner and export mixed amino acids through intravenous solution manufacturers in Armenia or directly to intravenous solution manufacturers

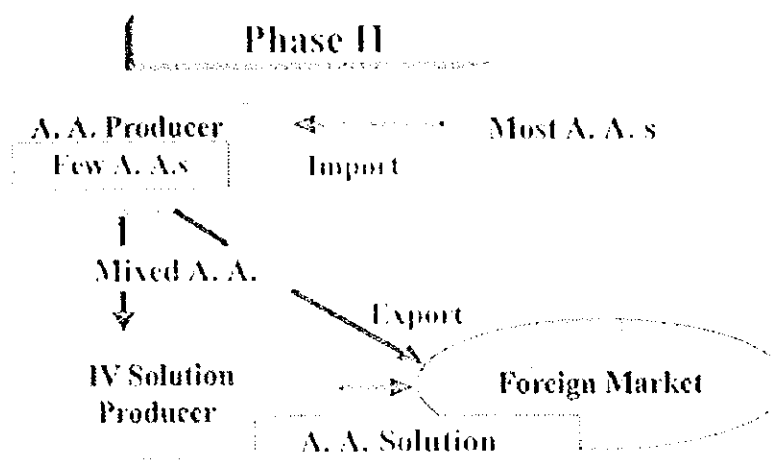


Fig. 3.3.3.6 Conceptual Framework of the Second Step

Considering past experience and being technically easy to be produced, it would be appropriate to select lysine for the first product.

It will increase in types of amino acids to be produced gradually, and will reach the third step.

c) The Third Step

It produces most types of amino acids and imports a part of them and produce mixed amino acids.

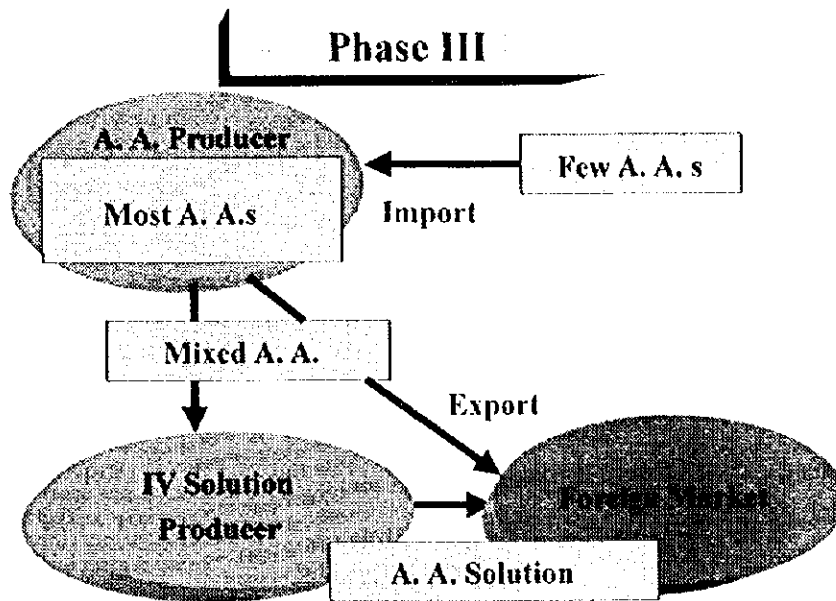


Fig. 3.3.3.7 Conceptual Framework of the Third Step

Abbreviations:

AA :	<i>Amino Acids</i>
IV:	<i>Intravenous Solution</i>
MOA:	<i>Ministry of Agriculture</i>
ADA:	<i>Armenian Development Agency</i>
MIT:	<i>Ministry of Industry and Trade</i>
NAS:	<i>National Academy of Science</i>

Considering past experience and being technically easy to be produced, it would be appropriate to select lysine for the first product.

It will increase in types of amino acids to be produced gradually, and will reach the third step

e) The Third Step

It produces most types of amino acids and imports a part of them and produce mixed amino acids

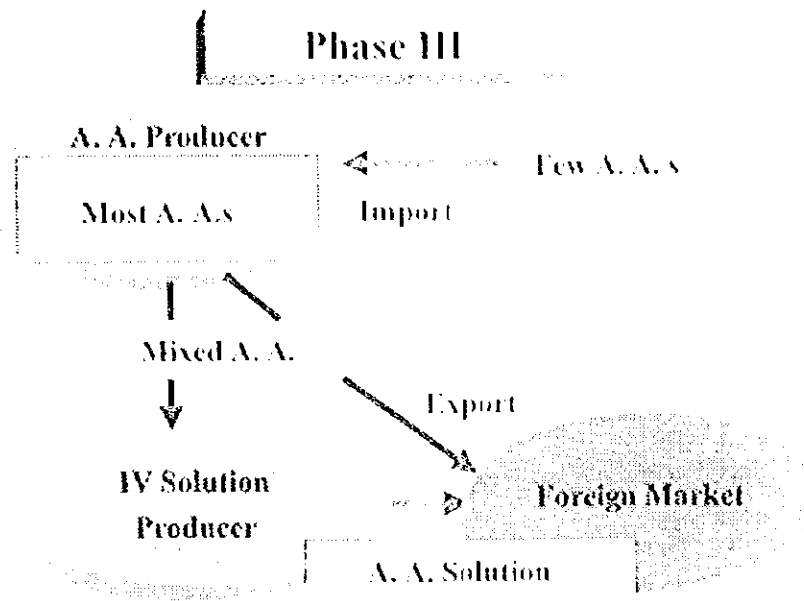


Fig. 3.3.3.7 Conceptual Framework of the Third Step

Abbreviations:

- AA* : *Amino Acids*
- IV* : *Intravenous Solution*
- MOA*: *Ministry of Agriculture*
- ADA*: *Armenian Development Agency*
- MIT*: *Ministry of Industry and Trade*
- NAS*: *National Academy of Science*

Note 1 : Market situation of pharmaceutical amino acids in the world

Amino acids used pharmaceutical purposes, are mixed by a couple types of amino acids base on type of disease. They are used as intravenous solution essential to serious patients or as oral medicine. Manufactures of pharmaceutical amino acids mix several amino acids produced according to subscriptions by types of disease, and ship to intravenous solution manufactures or oral medicine manufactures. In addition, popular amino acids that are used independently are glutamin for anti- tumor and arginine for hepatic disease. The following is demand on amino acids by its type.

Name of Amino Acids	Worldwide demand (ton)	Current Price (per kg)
Lysine	150 - 200	\$7 - 10
Glutamin	1,000 - 1,200	\$24 - 25
Arginine	800 - 1,100	\$19 - 20
Isoleucine	600 - 700	\$74 - 75
Leucine	500 - 600	\$23 - 25
Valine	500 - 600	\$35 - 36
Histidine	120 - 140	\$64 - 65
Total	3,670 - 4,540	

The following is trend of demand on pharmaceutical amino acids by market.

Market	Estimated Demand (1999) (ton)	Demand Forecast (2005) (ton)
Japan	1,000	1,600
North America	1,000	1,600
Europe	1,000	1,600
China	1,200	3,200
Others	400	2,000
Total	4,600	10,000

Note 2 : Analysis of production in the Lizin factory

Based on the information obtained from Lizin factory, yield (*) of its production is substantially lower than eminent lysine producers in Japan and other developed countries. In addition to that, because of lack of drying machine, Lizin factory cannot finalize the crystallizing process. The products were only crude crystalline lysine. Significant improvement on the quality would be necessary for the factory in order to compete in the world market. If their production cost were almost the same, which recorded in 1989 at Lizin factory, pro forma total cost of lysine based on the current price of raw materials would exceed the current market price of lysine so that the factory cannot make profit.

(*) Yield represents the percentage of lysine or other amino acids that can be produced from raw material (e.g. glucose) in terms of weight. Yield can be one of the most important factors to determine productivity in production of amino acids.

Note 3 : Alternatives to procure raw materials

There are some possible alternatives to procure raw materials

a) Use of crude sugar

Crude sugar can be used to produce pharmaceutical amino acids. Armenia used to import crude sugar from Cuba for sugar refinery. Current international price of crude sugar is about US\$200 per ton.

b) Use of domestically cultivated potatoes

There is some lysine factories in the world to use potatoes as main raw material. Armenia annually cultivates about 400,000 tons of potatoes. There may be a possibility to use potato starches as raw material to produce amino acids. Price of potato could range US\$100-120 per ton.

c) Purchase of beet molasses from Iran:

Iran has 36 sugar factories, which use sugar beet as raw material. As a result, they produce 268 thousand tons of beet molasses annually. Price of beet molasses is reportedly cheaper as Iranian people are not used to produce alcohol because of their religious reason. "Lizin" factory used to try to purchase beet molasses from Iran. One unconfirmed information says that the price of beet molasses (purity degree is 60%) is US\$100 - \$120 per ton including transportation cost, which is comparable price against world markets.

d) Use of acetic acids

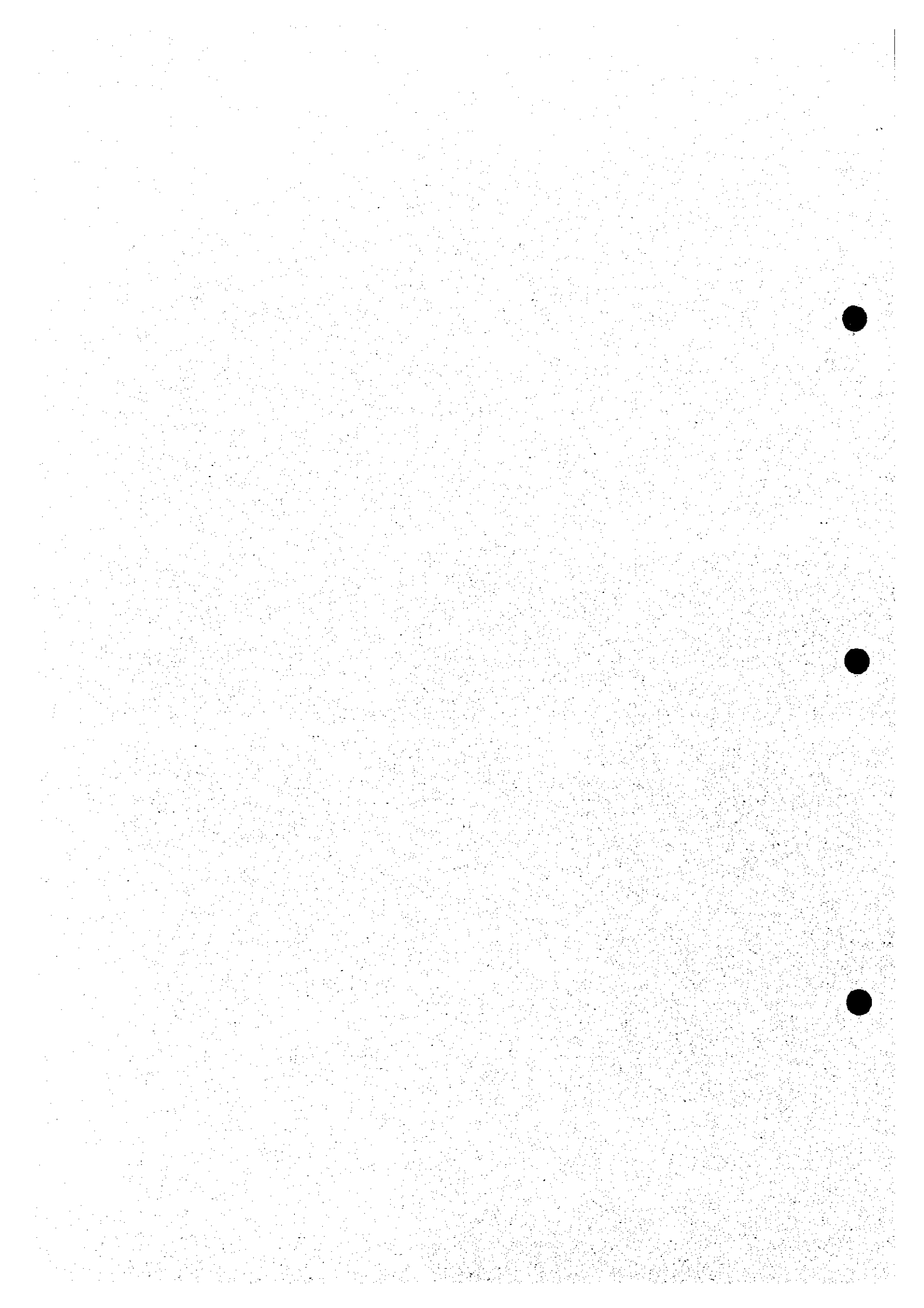
The technology of producing some amino acids from acetic acids has been already established. One of Armenian chemical enterprise "Nairit" can produce acetic acids. However, the cost would not be competitive, as Nairit has to import raw materials to produce acetic acids.

e) Use of topinambur

There is an academic research to use topinambur to produce alcohol products and amino acids. However, it seems to take several years to cultivate enough quantity of topinambur for its use as main raw material to produce amino acids, as there is no previous experience to cultivate them in Armenian agricultural field.

Chapter 4

Recommendations to Enterprises



4. Recommendations to Enterprises

4.1. Management Reform

- The management must have entrepreneurial spirit.
- It is the manager's leadership ability that nurses a free and broad-minded working environment in a company and realizes clear policy, speedy decision-making and active communication.
- The market never disappears. It is just the inability to grasp the changed market conditions and the inability to change one's approach regarding the market.
- There is a need to analyze the company's weak and strong aspects, assess the special characteristics of Armenia, and based on this to select products and markets.
- In cultivating the domestic market, opportunities with other sectors of economy (agriculture, construction, transport, trade, etc.) should be sought.

There are a large number of entrepreneurs in Armenia with ambition and ability. At present many of them are looking for somewhere to demonstrate their talent in Russia and other foreign countries. Although Russia is a high-risk market, Armenians have been extremely active there. Also in Armenia, there are several successful enterprises with experienced managers and industrious employees, businesses that successively have been setting themselves challenges with new products and business. To the question, "What is the secret of your success?" put to companies by the Study Team, the most successful company's president at present answered: "There is no special secret, it is only the ability to be faster than other businessmen in organizing production and offering what the market demands. Especially speaking, do not use government officials as managers."

Among the surveyed enterprises, there were a few companies which, in spite of the severe management environment, have strong leadership, challenging new products, and efficient and successful investment. There are several successful, rapidly developing enterprises in food industry, light industries, construction and commerce. In these enterprises management has strong will and leadership and employees are working there lively. On the other hand, for many of the companies in stagnation the most serious problem is lack of the determination and ability of their managers to overcome present difficulties.

Below we set out advice to the managers of these companies:

(1) The Role of the Management

In order to improve management of Armenian manufacturing industries there is a need to fully understand that; "The task is to restart business activities of half bankrupt companies, rather than to improve management of companies operating at a consistent level ".

1) The Management must have Entrepreneurial Spirit.

The management of companies in stagnation in the post Soviet era can be described as follows:

- The management has lost its will to revive the company.
- The management wants to revive the company but never come up with a strategy and concrete measures.
- The management understands what measures should be taken to revive the company. However under the difficult business environment they can not find the solution.

A leader with vigorous mental determination to revive the business and ability to exercise a strong leadership is the solution for a company in such a situation.

Consultation channeled through an organization is another way to aid business; however, the organizational system needed to respond to this is not in place. The key is a strong leadership with swift judgement, decision-making and action. There are skilful leaders, however, they are few and far between. The reason why the old type managers cannot exercise leadership (except personal qualities) is because they do not have the knowledge necessary to run a company in the adopted free market system. Lack of knowledge, experience and therefore lack of confidence is the main reason for the absence of strong and determined command. All efforts should be made to seize every opportunity through applying management that complies with the rules of the free market economy.

Those people who have been involved in management tend to have difficulty in adapting themselves to the new business environment under a free or market oriented economy. Those people should forget the old glorious days. They should start from zero. However those who do not possess this kind of adaptability ought to retire and be replaced by fresh management. In order to make such a replacement feasible, a system that allows free discussion is indispensable. If replacing management is too difficult, then they should bring in capable people from outside as directors or advisers and give them a free hand to improve the operation. It also takes strong leadership from the management to realize such measures.

2) Activation of Organization

Most of the Armenian companies are well-organized entities. Yet, there is an impression that although well organized they lack liveliness. An environment that promotes free discussions and

arguments within a company is absent. Actually, the explanation that the people who shape the organizational structure are aging is not the main reason. These are given below:

- The company president's guidance is insufficient.
- The managers under him base their judgements on their experiences from the old system.
- Insufficient influence of the rest of employees
- Insufficient desire for self-improvement by the rest of employees
- People accustomed to the top-down pattern of the former command system.

It is the task of the management to solve these problems through creating an open-minded environment within the company.

3) Thorough Market Analysis

The managers think that the most significant change since the collapse of FSU is the "loss of their market". Is this really so? If this argument is wrongly reasoned out, it is impossible later to adopt correct recovery measures. While it is difficult to disregard the market that has disappeared, there still remains a market. They need to analyze this market but many of them do not possess such skills. They should start from this point and try to collect market information without complaining about the loss of the old market. From this point new recovery measures should be designed.

The heart of the problem is not the lost market but the inability to assess changed market conditions and to decide the right approach to such conditions.

An electric bulb manufacturer for example, had been supplying their products widely to the FSU market. However they have now ceased operations. The reason for that should not be the "loss of market". Ample demand always exists if one considers the markets in neighboring countries. These products are daily necessity items and the demand never disappears. The same idea may apply to PCB production. There is always a demand for smaller electric home appliances and less costly PCBs. We may point out the fact that it is not the market that does not exist, rather the capability to analyze the market and adapt themselves. Young people who have worked in market oriented countries and gained experience there should be brought into the managerial elite or the sales department, and their ideas should be acted upon as much as possible.

Those who have worked abroad have a feeling for the market economy which old fashioned managers under FSU do not possess. It may be possible to employ people through the international Diaspora network, or to bring back to Armenia the younger generation who have left the country to work abroad to earn better money. Here, it is necessary to create absolute incentives such as handing out stocks on a results oriented basis once a recovery in business results has been achieved. This will give young managers greater motivation, and, if this means that the factory currently on half-production starts to show profits, then it can't be a bad thing for the enterprise owners either.

4) Formulation of a Business Plan

In order to carry out the activities of the company in its expected market, the next important thing is to formulate a business plan. Armenian businesses need to pay attention to the following aspects.

- Market research
- Restructuring the enterprise organization
- Development of new products
- Procurement of raw materials
- Improving the production lines and keeping the lines operating
- Transportation of the products
- Modernization of the accounting system
- Financing measures
- Securing profitability

Presently most of the production lines have ceased to operate. As far as there are a lot of difficulties to be solved, decision-making of the management could be negative. They do not need to be too pessimistic. The most important thing is the management leadership and their proper analysis of the current and future situation. These people have the experience of producing huge amounts of goods under FSU. Capable employees still remain in the enterprises. A business plan should be formulated based on the reality and a future vision.

More important are the issues to be dealt with outside of the enterprises. These are new challenges to them - finance, obtaining less costly raw materials, subcontracting, transportation problems and so on.

Where there's a will there's a way. Necessary information can be gathered along the way and new ideas will present themselves. Eventually the vision towards the future will be formulated. They will be able to plan mid-term and long-term business. Management can be carried out based on this long-term viewpoint.

(2) Analysis of Strengths and Weaknesses

In company analysis, a strength can be defined as a feature of the company or its product that is important to the customer in his decision to buy (it gives him a benefit) and that the customer perceives as being superior to the ones offered by competition. Conversely, a weakness would be the reverse. In addition, there can be some internal strengths or weaknesses, unknown to the customer, but known to management as the reason why some features are being perceived strong or weak.

Among the enterprises of the 3 Sub-Sectors analyzed, the managers have described weaknesses as the difficult conditions in which they are operating or expecting to operate. The members of the

Study Team have also made observations and from their responses some deductions have been made.

Many problems are common not only to the three target Sub-Sectors, but to the private sector as a whole. These features and weaknesses of Armenian companies in private sector have been pinpointed by means of questionnaire and company visits, and are laid out in Table 4.1.1.

Table 4.1.1 Features and Weakness in the Armenian enterprises

Nature of main required action:	Outer environment	Management	Human Resources	Technology
1-Collapse of Soviet Union and related confusion and reduction of market	X	—	—	—
2-Prohibitiveness in supply of raw material	X	—	—	—
3-Large volume, highly integrated and inflexible production system	—	—	—	X
4-Outdated production facilities	—	—	—	X
5-Losing technology	—	—	—	X
6-Transportation difficult due to blockade	X	—	—	—
7-Very low level production capacity	X	X	—	—
8-Outflow of qualified researchers	X	X	X	—
9-Deterioration of skill level	—	—	X	X
10-Lack of Research & Development in factories	—	X	X	X
11-Lack competitive products	—	X	X	X
12-Lack of international standards in quality, price, customer expectation, marketing methodology and management	—	X	X	X
13-No young factory workforce	—	X	X	—
14-No working capital	X	X	—	—
15-Disappearance of support from Scientific Research Institutes	X	—	—	—
16-Highly centralized management structure and decision-making	—	X	—	—
17-Weak or no appraisal of current situation	—	X	—	—
18-No action plan	—	X	—	—

Some problems can be solved by the company, others by the Government and others depend on other parties or can not reasonably be solved at all.

Problem 1 - Collapse of Soviet Union and involved confusion and reduction of market was the problem that started all the others. As a result of drastic reduction of demand in the FSU market, products can not be sold and enterprises that have no other market are suffering from lack of working capital. The outflow of qualified researchers and labor force due to non-payment of salary made it difficult to develop competitive new products, technology and idea. Because of the lack of capital, equipment is deteriorating and technology is losing.

The above problems 2-18 can be roughly brought together under four headings.

1) Outer Environment

Problem 14 - no working capital - is mentioned by almost everyone. It is difficult to do anything without money. However, some money is becoming available for enterprises that can justify its good use. For this justification a new approach is needed; management must present a workable project and organize its successful implementation and control.

2) Management

Problem 10 - Lack of Research & Development in factories - and problem 15 - Disappearance of support from Scientific Research Institutes - are related. Armenia had superior Research Institutes for the electric/electronics, machinery, chemical and pharmaceutical industries. The factories thought the system in place did not need a research department. There are some relations in interdependency between research institutes and industries. The government can help the process through introducing incentives.

Problem 16 - Highly centralized management structure and decision-making - is a people and structure problem. A more decentralized decision-making process will develop a sense of responsibility throughout the organization and thus more problems can be solved.

Problem 17 - Weak or no appraisal of current situation - appears from the lack of clarity of financial results. Some enterprise managers acknowledge the need for accounting, market research, marketing organization, business partner selection and business plans.

As to problem 18 - few enterprises have an action plan - 30% of companies don't report any action plan for the company. Others do, but not always indicate evidence of anything really happening.

3) Human Resources

Problem 8 - outflow of qualified researchers - and problem 9 - deterioration of skill level - are compared to the top and back of a coin. There are still many qualified people who, when given the opportunity, will update their skills to new requirements. Today, new skills that were not available before are required: accounting, marketing and coordinated general management. This is the people aspect of problem 12 - lack of international standards.

With regard to problem 13 - no young factory workforce - perhaps younger people are working in other Sub-Sectors or abroad. The enterprises of the surveyed Sub-Sectors will have to tackle the replacement problem when their companies start to stabilize and develop.

4) Technology

Concerning problem 3 - Large volume, highly integrated and inflexible scale production - the structure has to be adapted to a new scale. Since not everything can be integrated, clusters of independent but related businesses will have to work together.

Solution of problem 11 - Lacking competitive products - is a prerequisite to solving the others. It requires a "discovery process" including market research and testing, determining compatibility with production equipment, sales organization and profitability.

(3) Selection of Promising Products and Markets

1) Effort also to Cultivate the Domestic Market

The majority of Armenian enterprises should pay considerable efforts to exploit the domestic market. There will be a certain level of demand if they search business chances with an open mind not only to manufacturing but also agriculture, construction, transportation and the field of trade, etc.

2) Discover Business Chances/Promising Products by Systematic Method

As mentioned repeatedly, in the electric/electronics industry, there are few existing products that can be called promising. It is also difficult to specify the promising products of the machinery Sub-Sector. The enterprises should seek business chances/ promising products in the market by means of a systematic method.

The procedure of the method is:

- a) Take inventories of own engineering resources (knowledge, skill and facilities), and pinpoint the strong or unique point.
- b) Determine the type of business that makes the best use of this strong point. The business type categories are as follows:
 - Material processing
 - Parts making
 - Half-finished goods
 - Finished goods
 - System development
 - Various types of services to be offered
- c) Conduct market research.

As an example of market research, if statistical data of imports can be obtained, they will give hints as to which goods to make locally instead of importing.

3) On Consideration of Armenia's Obtaining Circumstances

- Highly educated human resources
- High cost of transportation
- Limited producing of raw materials
- Small domestic market

In the machinery industry mechatronics, fine mechanical and micro-mechanics can be expected to be the promising fields in the future.

As for the electric/electronics industry, those types highly weighted towards intelligence in the production side are suited to Armenia. PCB design and LSI design look highly promising. One could start initially as a subcontractor for LSI design. Once familiar with systems technology, the desire to create original LSI design could become reality, increasing businesses offering high value-added. (See 3.3.1.(2)) .

There should be other more promising fields.

4.2. Marketing

- In a market with little appeal, if the aim is to introduce foreign investment, government measures must be taken to make up for this lack of appeal and businesses must lobby the government hard in order to see this happen.
- In an uncertain management environment, it is vital to develop and improve on the marketing plan so that one can start to understand the market environment better than one's competitors, whilst at the same time also understanding one's own company better and how successfully it responds to one's efforts.
- For Armenian businesses with limited marketing experience, the implementation of a "Marketing Mix (T+4P)" will be effective in creating a basic systematic marketing plan.

The management of all of the companies surveyed had an interest in marketing. They already had used and are using some marketing tools, such as:

Table 4.2.1 Marketing tools for enterprises

① Marketing	→ Comparison of products with competition
Research	Determining possible market size and segmentation for products
② Sales	→ Collection of sales proceeds
③ Promotion	→ Use of media advertising (newspapers & TV)
	Product leaflets
	Direct mail to make sales in FSU
	Showrooms for products
	Participation in trade fairs abroad.
④ Product	→ Adaptation to existing market with new products
⑤ Price	→ Concern about price and knowledge of competitor prices.
⑥ Place (Distribution)	→ Products are delivered to customers

The weakest areas observed are related to management procedures, such as:

- Information systems: to report on status and progress toward goals, and to systematically accumulate information needed for future decisions or controls.
- Marketing plan and strategic direction for the enterprise: to better understand the capabilities of the company and opportunities in the market place.
- Organization of marketing personnel within the enterprise and within the market.
- System of sale: to increase the efficiency of marketing/sales activities and the volume of business.

1) Development Stage of Marketing Activities in Target Sub-Sectors

The marketing activities of the companies in the Target Sub-Sectors are not what one could expect from a "world class" competitor, but being carried out in line with the objective established by management.

a) Development Stage of Marketing Activities

The companies visited were all in an early stage of turnaround where the sole focus of the company was cash. They are progressing from Phase I to Phase II (see Table 4.2.2. Marketing Strategy) by trying to take concrete steps towards improvement and up-dating their know-how.

Table 4.2.2 Marketing Strategy

Phase of Development	I Management Objectives	II Appraise	III Stabilize	IV Growth
Focus/Company	→ Cash	→	Profit	→ Growth
Target/ Market Share	→ Sell for Cash M/S Low Priority	→	Hi-Profit Segment	→ Extend Segment
Price	→ Raise	→	Maintain	→ Lower
Promotion	→ None	→	a little	→ Invest
Product	→ Cut Low-Profit	→	Add Hi-Return	→ Develop Line
Place	→ As is	→	Adapt	→ Develop

b) Market Attractiveness

For foreign investors attractiveness of machine building and the electric/electronics sectors that used to be main industries in Armenia is currently low. There is a very small domestic market to build on, the former (foreign) customers and suppliers have disappeared and, the current product and manufacturing technology has aged, etc. The increased cost of transportation has become a serious drawback and it would be extremely difficult for these manufacturers to catch up and compete on a global level on their own strength alone. In electronics industry the fast pace of technological change makes partnership with an established world class competitor almost mandatory.

If the plan is to introduce foreign investment, then the reality of the above must be taken seriously and government measures must be taken to make up for the lack of appeal in this market. These enterprises must lobby the government hard in order to see this happen.

c) Infrastructure

The relative efficiency of companies is influenced by the infrastructure in which they must

operate. Marketing approach and efficiency is very dependent on factors such as:

- Access to Information:

There is less official information available than in developed markets. When available it is less reliable and more difficult to obtain.

- Communications:

Most foreign industrial centers operate in an environment of reliable and affordable communications. This is imperative to maintain contact with the customer and understand his needs in a timely fashion.

In this respect, Armenian companies are at a great disadvantage.

- Transportation:

In the case of Armenia, companies face unavoidable high costs whereas most foreign industrial centers benefit from reliable transportation at competitive costs.

- Availability of Marketing Skills

It is difficult to find people with marketing experience in Armenia. Some market research and advertising agencies are active in Yerevan, but the companies need to integrate inside knowledge into their marketing effort.

- Availability of Credit (Terms of Payment)

The choice of terms and conditions is limited for Armenian suppliers. Outside competitors can benefit from working capital at reasonable cost and can grant customer terms of payment as needed.

2) How to Prepare for a Competitive Marketing Program

a) Understand Current Situation

The minimum information would include the amount of sales and gross profit (variable). Prepare to have regular updates on this (example every month). If the company's financial system is not computerized, organize to have "needed" manual information reported on set dates (example 5 working days after the end of the month). Eventually the company will develop forecasts and compare actual performance to it.

Gather in an organized way information as shown in Table 4.2.3.

Their judgment of what is needed information, how to get it and how much it is worth in their decision-making process will progressively improve with experience. It is especially crucial to develop a marketing plan in an uncertain environment, because the staff of the company starts to understand the environment better than the competitors, also understand their own company better and how successfully it responds to their efforts.

Table 4.2.3 Target in Collection of Information

Object	Method and Measure
Performance in the market	Start an information system with regular reviews of the results with the management team.
Products	Define the characteristics of products, compare with competition, define needed improvements, possible cost reductions, possible new products, etc.
Customers	List the current customers and potential customers. Why do they buy from the company, from competitors?
Markets	Customers may respond to the same kind of sales promotion, will buy through the same channels, have common quality requirements such as ISO 9000. The market is best understood through product/customer segmentation exercises.
Competitors	Collect information on their products, methods of doing business, organization, financial results, promotional programs, etc.
Organization	Define responsibilities and delegate authority to the company's staff in order to achieve the objectives of the company.
Advertising & Promotion	Keep marketing record of the company and competitors' promotions. Try to define effectiveness of the different approaches that the company or the competitors have used. It will help when developing plans to introduce new products or to promote existing sales.

b) Basic Characteristic of Demand

Table 4.2.4 is a chart of the basic characteristic of demand.

The understanding of the basic characteristic of demand is important in order to sell one's product and to make new product matches to demand.

Moreover, there is a big difference in the characteristic of demand for industrial goods and for consumer goods.

Table 4.2.4 Basic Characteristic of Demand

		Industrial goods	Consumer Goods
1	Motive of purchase	Added Value creation in business	Physical consumption
2	Purchasing action	Reasonable, Economy	Wants, Satisfaction for money
3	Price elasticity	Low	High
4	Persons taking a part in purchase	Multi-layer (Top, Eng. Prod. Purchasing)	Single
5	Relationship of customer/ Supplier	Steady / Mutual dealing	Fluid
6	Convergence ratio of demand	High (by 20% customer for 80% demand)	Low
7	Periodicity of demand	Strong	Weak

c) Look for Improvements & Develop Opportunities

The main questions to answer are:

What would → Increase sales to customers?

→ Increase the number of customers?

→ Reduce cost & increase customer satisfaction?

By acting on → Products, Promotion, Price, Place (Distribution), Organization,
Knowledge, Process (sale, warranty, service, service parts, etc...)

d) Establish Goals & Aim to Reach Them

We recommend that an action plan using the following processes be established through active discussion by each enterprise's management and executives.

TODAY → **VISION** → **ISSUES** → **PLAN** → **RESOURCES** → **ACTION PLAN**
(1) (2) (3) (4) (5) (6)

Step 1— Define where the company is **TODAY** in terms of market share, profitability, type of products and their market coverage, manufacturing system, as well as the critical success factors (CSF's) needed in the company's business such as product quality, speed of delivery or service, method of sale, etc..

Step 2— **VISION** of where the company wishes to be in the future, in terms of market share, profitability, type of products, etc....

Step 3— Determine the obstacles (**ISSUES**) to getting there.

Step 4— Make a **PLAN** to eliminate or decrease obstacles

Step 5— Procure **RESOURCES** to realize **PLAN**. The needed resources may be available or the company can reasonably acquire them through internal development, purchase, hiring, partnership, bank financing, etc...

Step 6— develop a **PLAN** of action to reach the **VISION** or an intermediary step, with resources that are within the company's control.

3) Marketing Mix (T+4P)

Marketing may appear difficult to Armenian businesses with little or no experience in this field. Clarified below are five major points a)~e) (taking the first letter of each - T+4P) which make up the basis for a systematic marketing plan.

a) Target

Marketing activities starts from setting the Target.

- Who is the target?
- What is it that the target wants?
- What is the scale of the target?

b) Products

Being in the stage of delivery to the market, it is necessary to review the target of a product. Analysis of the target should be carried out for each product.

- Can it meet the needs of the target?
- What is the target dissatisfied with about the product?

When there is a serious mismatch between the product and the target, it is necessary to look for another target or to abolish that product entirely. At the stage of developing new products, it is important to set the clear target image first.

- What benefit can be offered to the target through the product?
- What problems does the target have?
- What advantages exist compared to the product of competitors?

c) Price

Pricing is a very strategic factor and not a simple one like just saying, "Cheaper is better". In some cases, high pricing gives a good image, such as quality, to customers. Grasping the buying motive of the target is very important. Even if the price is reduced, a positive effect can hardly be expected for industrial goods when the product does not meet the needs of the target.

d) Place (Sales Channel)

The type of distribution channel influences other marketing elements greatly. The cost changes vastly according to sales route, for example direct or indirect selling through wholesalers or the agency. Promotion also differs respectively. It is necessary to decide on the distribution channel at an early time in the product development stage.

e) Promotion

There are various methods such as volume discount, bargain sale over a certain period, sales rebate and personal selling assistance, etc. besides advertisement/exhibition as a way to promote sales. Various combinations of method should be applied corresponding to the conditions of the target, the distribution channel and the situation of competition.

4) Market Research

Determining the above-mentioned T+4P is the essence of marketing, however it is no simple task. The fundamentals should be clarified when each element is decided upon. Market research or

target research is needed when there is no data for the fundamentals. In determining the marketing, one generally needs to move before all the research results are ascertained. Therefore, a hypothesis should be generated regarding the vague areas, and the marketing element be set based on this. The hypothesis will require experience and intuition. Marketing research based on the hypothesis should be carried out afterwards, and the validity of the hypothesis verified.

This is the basic procedure for marketing research. It is useless in terms of both time and labor to carry out the investigation and data collection at random without having a hypothesis.

4.3. Improvement of Technology

- Managers must recognize the importance of analyzing and researching scientifically the causes of faults occurring in products. This requires showing leadership in coping with this issue.
- Regarding quality control, it is of utmost importance at the product design stage to ensure reliability and prevent breakdowns in production.
- Effective traditional methods of quality control should be inherited and implemented with confidence.
- Systematic collection of customer response to products is useful in product development as feedback for making improvements.
- To improve technology and catch up to the global standard, one needs to give the key positions to brilliant engineers and introduce technology from the outside world and extensive technological research.
- To develop new products, first aim to develop the function and efficiency of existing products.
- Knowing what kind of new products one ought to develop comes from the demands of the market. Thus one needs to absorb market information.
- For an effective R&D, a system where concrete applied objectives are common to both R&D division and production division is preferable.

(1) Improvement of Quality

As a step towards carrying out product quality control, Armenia's manufacturing industry needs to pay attention firstly to management that offers to the customers good quality products. Another important aspect of quality control is the collection of information on product quality after shipping, however in Armenia's case that aspect has not been fully understood yet. It is a task for the future.

1) The Occurrence of Faults

There are two causes of error before shipping.

- a) Design faults
- b) Production defects
 - defective material or parts
 - work defects during processing or assembly

It is vital to grasp scientifically and precisely the reasons behind the occurrence of faults. Armenian manufacturing industries seem to be insufficient in the capability for this analysis. Managers need to recognize the importance of such analysis, even bringing in external

organizations in order to ascertain the cause of major faults; they must exert control for that analysis.

2) Product Reliability

Product design increases the reliability of a product. Increasing reliability means decreasing the breakdown rate during production. For this purpose the life span of the product should be identified throughout the design process. Product testing should be undertaken under severe working conditions. By using this accumulated data analysis, product design with an appropriate life span can take place.

Defects in product design cause the following problems:

- Decrease in reliability of the products
- Decrease in the yield of production

There are many instances where maintaining reliability depends on the design of the product. Generally speaking in production, design faults decrease the yield of production and bring about problems of defective products in the market.

In order that design prevents breakdowns in production, businesses need to recognize the ability of the production process. They need to fully understand any process changes, and encourage design that preserves special qualities, even should there be changes to production.

Armenian manufactures seem to be insufficient to understand the importance of having faultless design in contrast with the quality guarantee in narrow terms. If they perceive that a thorough quality inspection in the production process could sort out the products having any defect, they are misunderstanding the quality control adopted by the business of the world. The biggest cause of problems of defective products arising from the market is often attributed to the design faults. Therefore, right from the start one should be determined to "build up quality".

3) Quality Control in the Production Process

In the past, when production was being carried out on a large scale in Armenia, quality control in the production process was carried out according to GOST. This was an elaborate system; the basic principle was the same as the Western one with just minor differences. Documented instruction of this system was also well developed. This system could minimize the rejection rate of the products. We are not sure if this quality control system remains in place or not. Under the present situation that many factories have ceased production for years, we doubt the quality control system still remains in a workable condition.

As there may be useful systems among the past FSU heritage, those should be maintained and utilized in production.

4) Collecting Market Information

It is important to establish a system for gathering feedback of customers' reactions (claims etc.) regarding products. In Armenia this kind of system is not in place because it is new to market economy and its manufacturing industries do not have clear recognition for it. Information from customers is vital and should be made a major factor in management strategy. It becomes feedback for logical product improvement and also an important source for product development.

Once, "Made in Japan" used to have a reputation of being poor-quality goods, but it was changed to mean top-class quality as a result of thorough improvements.

(2) Improvement of Technology

The Armenian manufacturing industries used to occupy an important position in the Soviet Union. Though, in general, their technology was behind from the world-level, the electric/electronics industry of Armenia had a high level of technology as an exception. Unfortunately, most of the engineers who sustained the technology level have left the industry.

The following 2 stages are necessary for the enhancement of technology in Armenian enterprises.

- To catch up with the technological level of the world market
- To become a winner on the technological level in order to ultimately win in the world market

By working on these two stages whilst carrying out the following points, businesses can strive towards technological improvement.

1) Employment of Excellent Engineers and Technicians

Key people should be deployed at strategic positions within the enterprises.

2) Research and Introduction of World Class Technology

Taking the electronics industry, the technology level of Armenia is 10 to 20 years (or more) behind of the world-level. In order to catch up with the world-level, it is first necessary to identify precisely what the technology gap is through continuous research. Dispatching of appropriate experts to foreign countries may be required to carry out the research. For the dispatching the subsidy of the government and enterprises may be useful. A practical way is to introduce foreign technology. The technology gap is too big to be filled only by Armenian effort. Some people in the heavy electric industry seem overly confident in their technology. To have confidence is good in a sense, however they should also look at the good features of world class technology. Technology does not end at the point of manufacturing products with good performance. They need also to look at other features such as cost, appearance of the products, productivity, etc.

3) Development of World Class Technology

Superior technology is reflected in the products. It is important to study whether or not their products are marketable in the world market. Through the study measures to improve competitiveness may be found. In due course the necessary core technology can be identified and developed. By utilizing these core technologies new products can be developed.

4) Information Systems

Another technology requiring to be improved is the information systems. The promptness and accuracy of a computerized system are also the most suitable for the improvement of business efficiency. Moreover, it can be said that the spread of the computer has created "The Economy of Speed".

(3) Development of New Products

There is no need to repeat here those things that are important, in general, for the development of new products. Presupposing these, we will set out those points particular to the Armenian manufacturing industry.

1) Problem Areas of New Product Development in Armenian Manufacturing Industries

Currently, new product development in Armenian industries is inactive. This reflects stagnant production activity. Other factors are:

- The 'brain drain' of talented Armenian engineers.
- Enterprises do not pay attention to R&D division.
- Management system is not suitable to grasp the demand from the market.
- Under the market-oriented economy, few enterprises have tried to develop new products.
- In many cases the Production division and R&D division are not in the same organization (company).

The problems can be summarized into two issues;

- What kind of products should be developed.
- Organization of R&D division.

2) What kind of Products should be Developed?

a) Improvement of Function and Performance of Existing Products

When we think of R&D, it is not practical to dream that some epoch-making technologies or products will result. Supposing even that one has an idea for such an original new product, it is vital not to ruin the concept, but one shouldn't maintain such fantastical ideas of what development means. Particularly, considering the current state of Armenia, there is little point having such

expectations.

Instead, in developing new products, first of all, existing products should be paid attention to. The seeds that require development might be found in these products. Improving the function or performance of existing products is not too difficult to achieve.

b) Market-oriented New Product Development

It may be possible to come up with an epoch-making idea through steady and continuous efforts as mentioned above. All information regarding new product development comes from the market. The way to retrieve market information is as follows:

- Information exchange between the sales and R&D departments
- Gathering and analysis of products of other companies
- New product trends can be obtained through the Internet or industry publications. ADA may consider subscribing to these magazines in order to observe the industry systematically.
- Comprehensive market research and development of new products considering the current and future market trends.
- Listening to the buyers
- Participation in international trade fairs

c) Talent and the Organization of Development

Before discussing internal development structures, we will take a look at the current structure of R&D in the Armenian manufacturing industry as a whole. During the era of FSU, the major parts of both R&D division and production division belonged to one group. Within that system SRIs used to carry out the fundamental research, develop new products and occasionally make prototypes. The manufacturing companies in the same group undertook mass production. The combination between R&D division and mass production worked well.

After the collapse of FSU, in many instances, R&D and production divisions were split up into several enterprises, each of them were operated independently. Most of the excellent researchers and engineers left the SRIs and took jobs outside research. Thus most of the manufacturing enterprises have been left without R&D division and have lost the ability to develop new products.

In order to conduct R&D activities effectively, it is desirable to work with concrete applied objectives in a company whose objectives are also well defined and controlled. To achieve this, a system whereby both R&D and production divisions are managed under the same person is preferable. In management where the research division is independent of daily operations of the company, the tendency to lose sight of the original goals frequently rears its head.

As well as improving on the organization of the system, the person in charge of the research results must be very gifted in order to run an effective development program. Not only is the

employment of promising talent necessary but also the nurturing of this talent once they are in one's employment. They will require opportunities to study abroad as the enterprise expands.

On consideration of the above, the following points are proposed for consolidation of the system.

- Recombining of SRIs and enterprises or establishing R&D division in the enterprises.
- Recruitment of excellent researcher and engineers in R&D division.
- Cooperation between "academy" and "industry". The idea to set up "Academy linkage" is proposed in Section 5.3.2.(6).
- Information exchange between sales division and R&D division.

Ultimately, it is essential for R&D to be in keeping with the long-term plans of the company. These proposals for practical research methods are necessary for the majority of research activities. If, however, the aim of the company is to achieve world-class status, then it may necessitate to carry out fundamental research in R&D with a long-term view.

4.4. Human Resources Development in Enterprises

- Armenian businesses need to consider human resources from both the institutional side and the side of the individual.
- The goal of human resource development is to achieve better business performance through improving individual ability.
- The goal of the development of the organization is to maximize the multiplying effect of individual ability within a system that is in keeping with the company's objectives.
- The object is to find the most suitable organizational structure for carrying out the managerial strategy.
- The most preferable type of organizational structure in the case of Armenian businesses is one which has a unified command system, where the wishes of top management are transmitted in a united fashion, and where stratified authority and responsibility are firmly established.
- The effective use of staff is vital in creating an enterprise that can adapt, grow and develop in a competitive environment. To this end, it is important to find a means for improving and helping employees to demonstrate the skills they possess i.e. the introduction of an education and training program.

As to the development of the human resources of Armenian enterprises, both organizational and individual aspects must be taken into consideration.

(1) Organizational Aspect

A human being has the ability to judge and select things, and decides his/her action as a result of this ability. However, plural numbers of people cooperate to achieve a common purpose, because their individual ability is limited. This is the starting point of an organization.

The capability of an enterprise can be expressed by the following equation.

$$\text{[Capability]} = \text{[Ability to adapt to managerial environment]} \times \text{[Fulfillment level of managerial resources]} \times \text{[Vitalization level of organization and human resources]}$$

The activity of an organization and the members who compose it equals the output of the enterprise, and it is a basic matter of management to vitalize them.

1) Proposals for Management Strategy and Management Organization

There is a close relationship between management strategy and management organization and two well-known proposals are advocated. They are, "The organization is subordinate to the strategy" by A. D. Chandler Jr., and "The strategy is subordinate to the organization" by H. I.

Anzoff. What is required for the enterprises in this country now is to embody the proposal of "The organization is subordinate to the strategy". In other words, how to create the most suitable organizational structure in order to execute the strategy.

2) Organizational Form

There are various types of organizational form that an enterprise can take: line organization, functional organization, line-and-staff organization and so on. Functional organization and line-and-staff organization are shown as follows in a representative example.

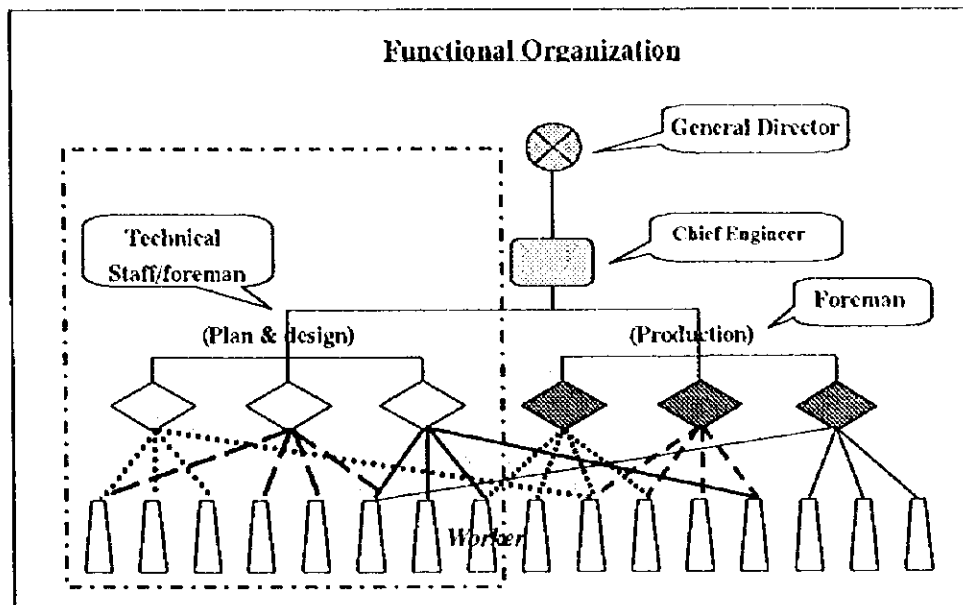


Fig. 4.4.1 Functional Organization

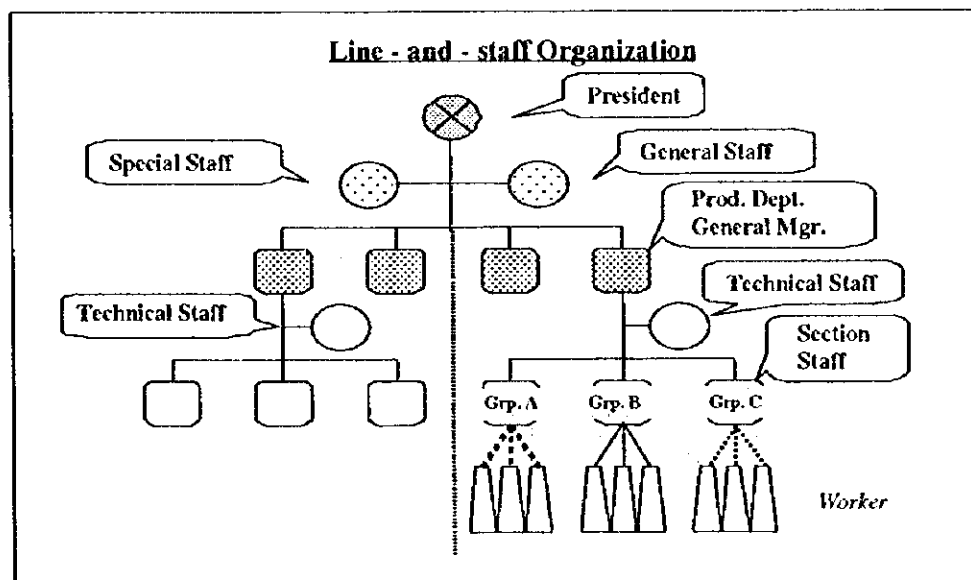


Fig. 4.4.2 Line-and-staff Organization

a) Functional Organization

- Feature:** Job function is specialized and work is made functional in each specialized job. The supervisor has the authority of command and instruction over all workers in his function area.
- Advantage:** The highly developed specialized ability of the supervisor divided into each job function can be used effectively. It is easy to manage a flexible business under conditions where there is a limited amount of manpower.
- Disadvantage:** Clear division of job function is difficult. The system of instruction and command at the work site becomes pluralized, and confusion is caused. Responsibility and evaluation of results becomes vague.

b) Line-and-staff Organization

- Feature:** The organization makes up for the faults of the traditional line organization (specialization), while making the best use of its own advantage (systematization).
- Advantage:** Because the command system is unified, the intention of the top manager is transmitted in an integrated manner. The authority and responsibility of each hierarchy is clear. The line unit can get highly developed, specialized support from the staff group.
- Disadvantage:** The authority of the line and staff tends to be unclear. Inflexibility of the organization such as sectionalism occurs easily, caused by activity of each organization unit.

It is the organization resembling the above-mentioned a) that can be seen in many Armenian enterprises. The business is managed with extreme arbitrariness. That is to say, the dependency on individual and personal ability is high from the top of the organization to the bottom. It can be said, "the synergy effect obtained by joint efforts toward achievement of the common purpose" through systematization is insufficiently displayed.

It is desirable in Armenia's situation to establish line-and-staff type organization through which the following merits can generally be obtained, although the organizational form must ultimately be decided by the stage of growth and the managerial environment of each individual enterprise.

- Display of synergy effect by systematization
- Clarification of authority and responsibility
- Plan, execution, and evaluation of result by section

This is a suitable organizational form for promotion of the management cycle "P-D-C-A". The budget and management by results of each section are especially important for securing profit

under severe price competition. As a result, the construction of a clear cost control system becomes possible. It is possible to understand clearly the influence (plus and minus) that the activity of each section has on the product cost.

(2) Individual Aspect

“Effective use of manpower” is necessary so that the enterprise can develop and fit into a severe environment. It is necessary to find a way to make every employee demonstrate his full ability and to improve that ability further. That is to say, it is necessary to introduce an education and training program.

1) Kinds of Education and Training Program

It is a good idea to design the content of the program separately for each hierarchy level as follows:

- a) Education and training of new employee
- b) Education and training of supervisor
- c) Education and training of manager
- d) Education and training of top manager

a) Orientation Training for New Employee

This consists of introductory and basic education.

Introductory education:

- for understanding the outline, policy, and product of the company
- of basic manners for group activity
- of general knowledge necessary for accomplishing tasks

Basic education:

- Basic knowledge on business is taught separately for each assigned section and function.

b) Supervisor Education and Training

Five skills are required of a supervisor: knowledge of the work, of responsibility, the skill to educate, the skill to improve, and the skill to handle personnel. This training is to master and improve these skills.

c) Manager Education and Training

Abilities required by the manager are the principles of administration, organizing and planning, time management, nurture of the representatives, methods of improving work, and maintaining safety of the work, etc.

d) Top Manager Education and Training

The abilities necessary for top managers include the following items.

- Ability to analyze and use various information inside and outside of enterprise
- Proposal and decision making ability on business policy and strategy
- Leadership in management
- Ability to train successor

2) Education and Training Technique

The technique of education and training are classified as follows by purpose.

- a) Acquisition of knowledge: Lecture, Visit
- b) Mastery of skill: Simulation, Experience
- c) Nurture of problem solving ability: Case method, Role-playing
- d) Nurture of creativity and conceptional power: Brainstorming

3) The Operation Procedure of Education and Training System

OJT and Off-JT are methods to execute the program.

a) OJT (On the Job Training)

This is where supervisors plan enhancement of technology, knowledge, and experience of subordinates through their daily work.

Advantage:

- With substantial study, quick acquisition of the above is possible, and the effect is big.
- Continuous and repeated guidance can be given.
- The cost is comparatively cheap.

Disadvantage:

- Supervisor's work load increases.
- The effect is influenced by supervisor's ability.

b) Off-JT (Off the Job Training)

Off-JT includes group training conducted within enterprise, and training courses and visit, etc. conducted outside of the enterprise.

Advantage:

- Comparative ease of execution
- Systematic, efficient and uniform guidance

Disadvantage:

- Tends to be standard and general.

- There is a possibility of mismatching between the menu and the business.
- Rather expensive.
- Necessity of specialized supervisor

(3) Management Systems and HRM (Human Resources Management)

To deepen the readers' understanding of the relationship between business management and HRM and the revitalization of an organization as its effect, we refer to the actual HRM system of a certain enterprise and express the above (1) and (2) in the form of images in Fig. 4.4.3 and 4.4.4.

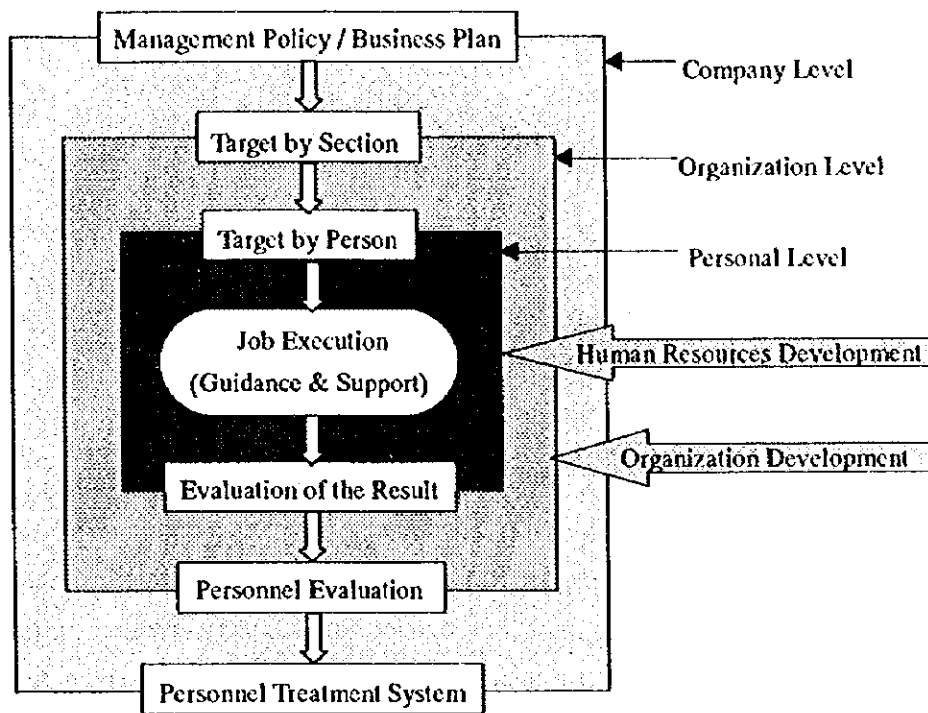


Fig. 4.4.3 Management Systems and HRM

Fig.4.4.3 conceptualizes the relationship between the basic management systems and HRM and organizational development as its effect. The goals of company management and the management policy evolve in the objectives of each division and those are further divided up into the objectives of each individual. Then, through self-appraisals by each individual of their work results and also staff evaluation on an institutional level, a system can be created for assessing pay based on results in accordance with the standards of the company's own system.

Improving the skills of employees will in turn reward the company with better performance and thus this is the goal of HR development. Meanwhile, the aim of organizational development is to maximize the multiplying effect of individual ability within an organizational system that works towards a common goal.

The basic concepts for HR education and training programs, and their structure are set out in Fig. 4.4.4.

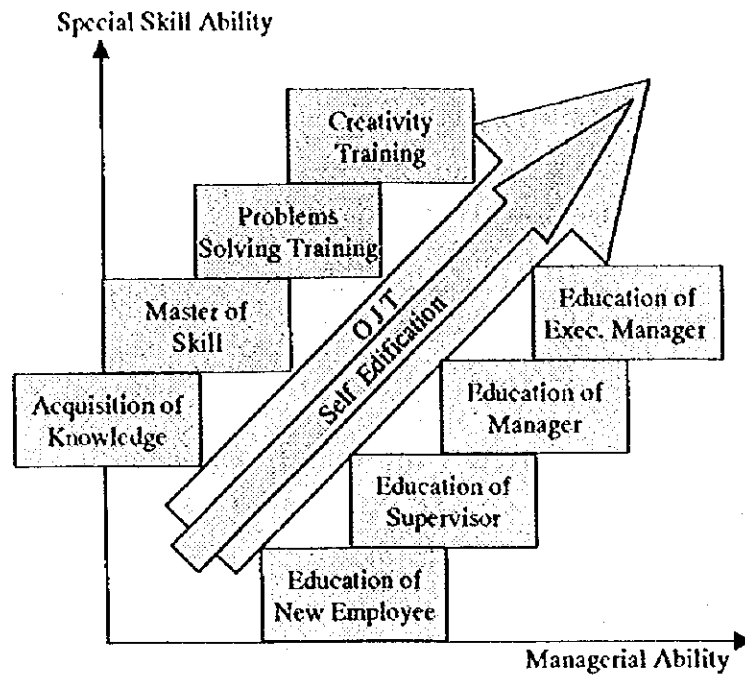


Fig. 4.4.4 HRM Development Program and its Structure

As illustrated in Fig. 4.4.4, this is a dual-faceted training program set-up: an education program which supports improvement of managerial ability and has at its core self-enlightenment and individual skill development through on-the-job training, and secondly, a training program which supports the betterment of specialized technical ability required by the job. These programs take place, for the majority, off the job, however they incorporate OJT guidance and follow-up by supervisors besides the programs so that they can be systematically utilized. The lecture contents for those programs differ depending on the position and job description of the recipient individual. The system does not allow people to attend all the lectures; it allows them to attend lectures specifically chosen to meet the needs of the work they are expected to carry out.

4.5. Implementation of Immediate Measures

- ➔ Formulate short, middle and long-term business plans and also monthly plan as a means of following up the short-term plan.
- ➔ Introduce a regular cycle of plan management.
- ➔ Prepare reports for plan management.

What became clear through Quick Survey and Model Enterprise management guidance was that although, on one hand, many companies were carrying out some kind of production control, they lacked established rules on the management side. The majority of the companies lacked a proper management system; very few were implementing fixed objective management or were able to gain a precise and calculated understanding of the administrative conditions of their own company. Based on these circumstances, we propose that companies should not delay in taking the three steps set out below.

(1) Formulation of Short/Middle/Long-Term Business Plans

Formulate short, middle and long term business plans (see section 4.6.) and a definitive action plan for achieving them. To make a business plan, prepare a plan for the middle-term that will realize the long-term plan, and a short-term plan suited to the first year budget of the mid-term plan. Additionally, prepare monthly schedules to follow up the short-term plan. To devise the middle and long-term plans, set their objectives based upon the results of levelheaded analysis of the company using such methods as SWOT. The subjects of planning and management are sales, production, inventory, costs, profits, personnel, R&D etc. Based on the results of market research both domestically and in neighboring countries, prepare a sales plan with relevance to the production plan for each product.

(2) Introduce a Cycle of Plan Management

The business plans should be administered according to the cycle below.

- 1) Obtain actual monthly results
- 2) Compare actuality with plan
- 3) Evaluate the degree of success of the plan
- 4) Pick up on major differences between plan and actuality
- 5) Find the right course of action
- 6) Discuss solutions to the problems
- 7) Implement countermeasures
- 8) Foresee achievements

Repeating this cycle regularly on a monthly basis, is the basis of plan management (and revision if required).

(3) Prepare Reports for Plan Management

For plan management, settle on the types of reports to be written, such as in the table below, and make the relevant sections responsible for their preparation and reporting to management. Companies can achieve a greater fluidity to their activity by carrying these out on a monthly basis.

Table 4.5.1 Main Reports for Monthly Management

Section	Reports for management
Administration & Accounting	General Monthly Report, Profit/Loss Report, Balance Sheet Summary Report, Monthly Financing Report, Expense Results by Section, Personnel Constitution, Organization Chart
Marketing & Sales	General Sales Report, Sales Result Report, Sales Promotion Progress Report
R&D, Engineering	R&D, Eng. Progress Report
Purchasing	Materials Inventory Report, Purchasing & Cost Down Report
Production	General Production Report, Production Cost Report, Production Cost Report by Products, Products Inventory Report

4.6. Formation of Short/Middle/Long-Term Business Plan

- ➔ The main objective of the short-term strategy is to develop demand so that continuous production is made possible, even if on a small-scale. The best use is made of the company's strengths and demand responded to through tie-ups with other companies.
- ➔ The main objective of the middle-term strategy is to create new products, expand the product line-up and strengthen the foundations through an increase in turnover. It is important to raise the company's technological expertise to the current world level and this can be achieved by narrowing the scope of the company's special field.
- ➔ The main objective of the long-term strategy is to establish status in global production by offering a unique product or service. To achieve this, world-class technology is essential and it is necessary to build cooperative relationships with world top-class companies.
- ➔ There must be systematic continuity each one of the short, middle and long-term management strategy.

(1) Presuppositions to Devising a Business Plan

In formulating a realistic and effective business plan, it is necessary to start with cool analysis of the present situation and business environment surrounding Armenian enterprises as follows.

- Completely non-functioning or barely functioning production line
- No internationally competitive products
- Lack of marketing activities
- Obsolete technology
- Lack of adaptability to new business environment
- Brain drain
- No financial support
- Expensive raw materials
- Poor infrastructure
- Difficulties in transportation
- Highly educated workforce still available
- Potential market in Armenia and in neighboring countries for both household and industrial use

In consideration of the above, Armenian industry should take the steps shown in Table 4.6.1. Furthermore, they should be prepared for future expansion.

Table 4.6.1 Building a strategy for future development

Period	Short term (1~2Yrs)	Middle term (3~5Yrs)	Long term (6~10Yrs)
Business objectives	Develop demand, secure orders Define the direction of the company	Strengthen management foundations Expand turnover Creation of new products 1. Production, sales of products for domestic demand = import products 2. Export parts and processing technology for foreign companies	Export a globally unique product or service Establish status and a share in the global industry
Technology	Establish and strengthen technology at which company excels	Catch up to the world technological level	Establish world-class technology Develop exclusive product or technology
Action	Discover business opportunities (interchange in same and other business worlds)	Marketing in the world market, take orders collaboratively with company tie-up	Establish cooperative relationships with multi-nationals

(2) Short-Term Business Plan

The most important target is to operate factories continuously even if only in small-scale production. One's greatest efforts must go into finding new business opportunities using information gathered by exchange with enterprises of one's own industry and those with other industries, thereby coming up with new product proposals and securing orders.

Next in importance is to establish and strengthen the technological field at which the company excels. Even if they have at last hit upon a great business chance, if they can not realize it on its own, or if the business seems related but the company lacks experience, there is little chance of breathing life into the project. Whilst striving to improve further this field of excellence, look into a structure (development~production~sales) that can answer to the demand one has found and that one can respond to by tying up with another mutually complementing company. Find a good partner to join the venture of the company. The Armenian temperament is strongly independent, but at this juncture it is vital to try to harness the multiplying effect of organizational cooperation rather than individual efforts, and also to promote exchange both within one's own industry and with other industries. This requires not simply the efforts of private companies, but also the active promotional support of the government.

The short-term plan has to be put into operation, and thus it should be spelled out in great detail. Key points for devising the short-term plan are written below. Solid investigation of these items

makes it possible to systematically identify the company's condition and any problem areas and to clarify which problems need to be solved and how to set about solving them.

- 1) Business strategy → product strategy → strategy for distribution channel
- 2) Sales strategy → turnover plan → sales plan by product → sales plan by market, by customer → business costs plan → business profits plan
- 3) Production → quality improvement → cost reduction → shortening production → lead-time strategy
- 4) Production plan → plan by product → materials purchasing plan → product inventory plan → production cost plan
- 5) Investment strategy → establish objective → appraisal of effectiveness
- 6) Organization, personnel plan → organizational control → personnel organization plan → HR education plan
- 7) Finances, accounting plan → devise profit forecast → capital supply plan → improvement of financial constitution

(3) Middle-Term Business Plan

The objective for the middle term is to strengthen the foundations of the managerial system. This is the most important step towards achieving the long-term objective of 'establishing status and a share in the global production industry by offering a unique product or service'.

In concrete terms, creating new products and bringing together a new product line up will strengthen the managerial foundations through increased turnover. There are two aspects in the creation of new products, 1) Production and sales of finished products for the domestic market (switching from imported products) and 2) Advancement into the global market.

- 1) Currently, a lot of manufactured finished products for the domestic market are imported. Armenia should target a number of these for switching to domestic production. It may be effective to begin by using a knock-down method by importing parts and semi-finished goods. On consideration of the scale of demand, rather than limit one's sight solely to the domestic market, it is important to further draw CIS countries into the scope of one's market.
- 2) With regard to the foreign market, focus on offering parts or processing technology to foreign businesses as opposed to finished products.

This requires raising technological ability to the current global level. The fastest way to improve one's technology is by further narrowing the scope of one's special technological field. Thus a tie-up will also be necessary to make up for what's lacking in the company's technology. However, advances in technology relying purely on the effort of private companies takes time and there is the fear that success may be elusive. To this end, there should be support in the form of policies such as government research institutes or technological advisers.

It must also not be forgotten that, when dealing with foreign firms, it is a condition that managerial skills conform to the global standard. So companies must forge a constitution that has the capability to administer and propel forward their action plan, while at the same time keeping a firm grip on the key points of the short-term plan mentioned previously. Once they can do this, a company is then able to tie up with a foreign firm. It is premature to advise tie-ups with foreign firms at this point in time without due preparation.

Marketing takes place when reaching out to the wider global market. Once the point of tying up with another firm -- part of the short-term plan -- has been reached, it is also possible to have a joint strategy for marketing activities and this will help to alleviate the cost burden. It also leads to bigger business opportunities.

(4) Long-Term Business Plan

In the long-term Armenian enterprises should aim for world class technology. They should look towards developing their own technology and their own products based on this. The ideal is for them to create a unique product that enables them to operate exclusively in a niche market.

The globalization of the economy implies that firms without technological strength that had survived within a geographically limited area will be increasingly driven into a corner. Thus, acquisition of world-class technology becomes inevitable. So, as well as attempting to bridge this technology gap relying on their own strength (with support from the government), it is also practical to build up cooperative relationships with world top-class companies. To attract the interest of multinational companies, Armenia should have some sales points to offer. These may be as follows;

- Less costly labor force
- Proprietary Armenian technology
- Location advantage
- Incentives and assistance offered by Armenian government
- Spacious and modernized factory

Some of these points should be obtainable during the middle-term (or second phase of the business plan).

There must be continuity to each one of the short, middle and long-term business plan. If it is possible to bring together continuous organizational efforts in the short and middle-term, then the likelihood of achieving the long-term goals is high. In other words, no matter how well thought out and definitive the action plan for the short-term may be, the most important thing is actually being able to realize it. Otherwise, time and expense is wasted on meaningless and unrealistic middle and long-term plan consultation -- wasted resources that mean lost growth for the company.