ENGINEERS, ENTREPRENEURS AND THE ASIMOW PROJECT

By

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INTRODUCTION

The primary objective of this discussion is to describe a unique an rather remarkable example of a group of engineers functioning in th entrepreneurial role. Specifically, attention will be given to the activities, no underway in a number of countries, popularly known as Asimow Project named after their founder, Professor Morris Asimow of the Universityof Californi Los Angeles. Before commencing this discussion, however, it would be usefu to make a few brief observations regarding engineers and entrepreneurs.

It is only logical to anticipate that nobody in this group would have any particular difficulty in defining the characteristic functions and role of the engineer. The engineer is the individual responsible for the translation of scientific knowledge into practical applications of human value. Engineers are involved in such activities as the planning, design, construction and management of such items as machinery, manufacturing plants, roads, bridges, buildings, and so forth.

Properly defining the entrepreneur is a much harder job. For the purposes of this discussion, the concept of the entrepreneur generally associated with the economist, Joseph Schumpeter, will be assumed. In the Schumpeter sense, the entrepreneur is the individual most closely responsible for the initiation of innovations of a commercial nature and the individual who assumes the major share of the risk of commercial innovation. Innovations may be of many types, for example, the introduction of a new and unique product, or the establishment of a new plant to manufacture an existing product. Innovations may occur of a marketing nature, such as the establishment of a new retail outlet or, perhaps, the introduction of a new form of retailing or wholesaling.

The important thing to recognize is that the Schumpeter entrepreneur is the principal risk-bearer in society. He is separate and distinct from the manager who is paid a definite salary for a specific job, and the capitalist, who lends money for a predetermined rate of return. In effect, the entrepreneur is the driving force of economic progress in any economic system, whether centralized or decentralized. Psychologists have described entrepreneurs as being strongly individualistic, independent, optimistic and often somewhat disagreeable in personality.

In many respects, the personality profile of the typical engineer differs idely from that of the entrepreneur. The engineer is professionally oriented, e derives satisfaction from perfection on the job, he is precise and often onservative in outlook toward economic change. The question may be raised s to the ability of the typical engineer to assume the entrepreneurial function. levertheless, at different periods of history engineers have established signifiant reputations as entrepreneurs. The names of such people as Fulton, oebling, and so forth, readily come to mind.

he Asimow Projects

Let us now examine the Asimow Projects, a systematic attempt, backed hard cash, to thrust the engineer into the entrepreneurial role. First, in few words, what are the Asimow Projects?

The Asimow Projects are cooperative programs of microeconomic development carried out jointly by teams of students and professors from a university in a country with a mature economy and a university in a developing country.

The original Asimow Project was initiated in 1961, as a joint effort of the University of California, Los Angeles and the University of Ceara, Fortaleza, Ceara, Brazil. Principal support for this undertaking was provided by the Ford Foundation.

Asimow Projects subsequently have been undertaken in five states of the Northeast of Brazil, Ecuador and Mexico. Projects are now at various stages of development in the Philippines, South Korea, Thailand and in several countries of Central and South America and Africa. The Polytechnic Institute of Brooklyn has recently initiated at Caruaru, Pernambuco, Brazil, a project in cooperation with the University of Recife.

The name "RITA" standing for "Rural Industrial Technical Assistance", has been used to designate in the Asimow Projects in those instances where the projects have been supported by the U.S. Agency for International Development.

To date, only Universities from the United States have served as the representatives of the mature economies. Interest, however, in the basic Asimow concept has been reported from several European Universities.

All indications are that the Asimow concept will become a major vehicle of international economic development, involving a multitude of universities throughout the world.

Project Organization

The basic structure of an Asimow Project is as follows:

1. A population center in the host country is selected for development Ideally, the location would be clearly identifiable rural area of approximately 50-75 kilometers in radius. One or more major towns should be included in the region. It is desirable that at least one town be a recognized trading and commercial center. Of course, natural resources, labor characteristics, transportation characteristics, and so forth, figure in the selection process.

2. A team consisting of two to three professors and six to eight graduate students is recruited at each of the two cooperating universities. Team members are predominently engineers of varied specializations, although management specialists, economists, agricultural specialists and, perhaps sociologist or anthropologist may be included.

3. The basic project covers a period of four years. Field work is performed in the project region largely during vacation periods (June, July and August in the U.S.). Follow-up and back-up work is performed at the U.S university during the normal academic year. A small skeleton staff may remain in the project area during the academic year.

4. During the vacation period in the initial project year, the first several weeks are devoted to meeting community leaders, publicizing the nature and purpose of the project and surveying the general economic characteristics of the area. At the conclusion of this period, perhaps 10-12 potential industries are selected for detailed study from the multitude of ideas that have occurred to the project participants.

5. After preliminary analysis of markets, raw materials, manufacturing costs and so forth, a group of three to six specific industries are selected for implementation. The project members encourage the formation of committees of local residents interested in each of the proposed enterprises. Assistance is given to these committees in incorporating the new companies and the raising of capital. Typical industries are capitalized in the U.S. $100,000 to-$300,000 range. Generally, a substantial portion of the total capitalization is raised locally by equity participation and the remainder is obtained from lending institutions.

6. During the U.S. academic year, detailed study and analysis of the proposed industries is performed at the U.S. university. Students and professors from the developing country attend special programs at the U.S. university and, in addition, participate in the design of the pilot industries. Managers selected for the pilot industries also attend special courses at the U.S university.

7. In the subsequent vacation periods, the combined university teams assist in the construction and start-up of the pilot industries, provide specific

technical assistance to the pilot industries and advise on problems of management, marketing and finance.

8. During the third and fourth project years, the developing country university gradually increases its share of the work burden and responsibility in the initial project area. At the end of the fourth year, the basic concepts and methodology of the project should be institutionalized at the host university.

9. Costs for the typical Asimow Project approximate $150,000 to $200,000 per year. Professors receive ample professional salaries, while students receive pay during the vacation periods in the $250-$300 range.

Objectives

Asimow Projects are multi-purpose undertakings designed to achieve a variety of objectives. The more important objectives should be indicated:

1. Promote the economic development of the selected region by the establishment of the pilot industries themselves and the inevitable secondary industries.

2. More importantly, provide a demonstration to the developing country, of the ability to foster small industry and the techniques of fostering small industrial developments.

3. Establish the local university as a regional economic development center. The local university should be ready, with the departure of the university from the mature economy, to undertake new projects in other communities, thus multiplying the economic impact.

4. Retard the movement of rural populations to urban areas. Traditionally, this movement has been associated with economic distress and severe social and political disorder.

5. Provide markets for local raw materials and force improvements in production techniques and quality of local raw materials.

6. Encourage the development of local entrepreneurial, managerial and vocational talent.

7. Prevent the discouraging phenomena known as the "brain drain" with respect to the students and professors of the developing country university.

8. Provide a means for the investment of local capital in local manufacturing industries, in contrast to investment in real estate, high interest rate loans or outside the region or country.

9. Encourage the development of open-stock companies with widely distributed stock ownership.

10. Encourage local ownership and control of industry.

11. Provide a very worthwhile educational and professional experience for the students and professors from the developed country.

12. Foster international communication and understanding through the personal friendships that arise from the day-by-day working and living relationships of the project participants.

Project Accomplishments

Before commenting on the success of the Asimow Projects, a few words are necessary regarding Professor Asimow and the basic rationale underlying the projects. Morris Asimow, a mechanical engineer and metallurgist, prior to embarking on his academic careeer, achieved a most distinguished background in industry. Functioning as an entrepreneur, Asimow founded, and successfully operated an aluminum processing company. The origin of the Asimow concept dates to 1949, at which time Asimow, working against seemingly impossible odds, built a plant in New Guinea which processed surplus World War II airplanes into aluminum scrap. The success of this venture convinced Asimow of the feasibility of establishing small industries in highly undeveloped areas. In 1961, Asimow was instrumental in convincing Brazilian officials of the desirability of attempting a test of the idea in the Brazilian Northeast.

The best statement of the theoretical basis and philosophy of the Asimow Projects was made by Asimow in an article titled "Project Brazil: A Case Study in Micro Planning", *International Development Review* (Volume VI, Number 2, June 1964). Stressed throughout the article were the following points:

1. The importance of the microeconomic approach, as contrasted to the macroeconomic approach.

2. The need to involve local communities actively in the economic development process.

3. The ready availibility of substantial amounts of capital in seemingly very poor regions.

4. The possibilities of mobilizing this capital in local industry, provided a mechanism is created to supply entrepreneurship.

Have the Asimow Projects provided this mechanism? As previously mentioned, the original Asimow project was initiated in 1961, while subsequent projects date to 1964 or later. For this reason, it is difficult to draw any specific conclusions as to the achievements or limitations of the Asimow concept for the case of the initial Ceara project.

The region selected by Professor Asimow for development consisted of the three small communities of Crato, Juazeiro do Norte and Barbalha. These towns, the largest about 30,000 in population, are located in the semi-arid "sertao" region of the Brazilian Northeast. Traditionally, Crato has served as a trading center for a region of about 100,000 total population. Although the towns are electrified, they lack telephones, are extremely isolated and ,by American standards, are rather uncomfortable and unhealthy places to live.

The Brazilian Northeast is a region that has attracted much world-wide attention in recent years. About 25,000,000 people live in the area. In general, the region is predominantly agricultural and extremely low living standards prevail. In some parts of the Northeast conditions are considered comparable to that of India and China. Population has been rising at a rapid and uncontrolled rate and has largely negated the economic gains made through industrialization. A mass movement of population has been occurring from the interior to Northeast coastal cities, such as Recife, and to the industrialized regions of Rio de Janeiro and Sao Paulo. This movement has contributed to serious problems of social and political instability in the Northeast and throughout Brazil. It is evident that in the absence of population control and effective industrialization, a crisis is inevitable in the not-too-distant future.

To date, the following operations have been established by the original project:

1. LUNA S/A–A shoe factory now manufacturing about 200 pairs of high-quality shoes per day, with plans for expansion to an output of about 500 pairs per day. This factory utilizes modern equipment and is employing modern techniques, such as time and motion study. Workers are recruited from the many cottage shoe manufacturing operations of the area. A clear advantage exists for the new factory over the older cottage operations, in that a sales staff can be employed to market the output in the major cities, thus regularizing production and obtaining a higher unit price.

2. Electromaquinas S/A – A factory manufacturing radios, small electric motors and roof trusses. Radio manufacture is based upon assembly of components from Southern Brazil.

3. CECASA S/A – A ceramics plant manufacturing construction bricks and roofing tiles.

4. IMOCASA S/A — A plant manufacturing processed corn products for animal feeds and human food purposes.

5. IBACIP S/A — A cement manufacturing operation.

In addition to the above, some eight other industries are at various stages of development.

Other Values

Perhaps more important than the actual industries established are the following:

1. A definite climate of enthusiasm and optimism has been created in the project region. Businessmen in the region actively support and cooperate with the projects. Knowledge of the existence of the project is widespread throughout Brazil, particularly in the Northeast. Other communities have very actively competed for the new Asimow projects that have been established. In Crato, at least one substantial plant has been established independently, but inspired by the Asimow Project. This is a plant built by a private group and capitalized at about $1,000,000 to manufacture paper from bagasse and cotton linters. The new industries have stimulated successive layers of complimentary demand and have been responsible for somewhat of an economic boom in the region.

2. The concept of the project has been well institutionalized at the University of Ceara. The University of Ceara has recently, on its own, embarked on a project in a second region in its state.

3. In several instances, qualified professional people originally from the project region, who had left to work in Rio and Sao Paulo, have been attracted home by the new industries. In addition, the Brazilian university has been fairly successful in retaining on its faculty the project participants.

4. The project has been surprisingly successful in obtaining local capital and encouraging the development of open-stock companies.

Limitations

Obviously, as in any entrepreneurial situation, success has not been unaccompanied by failure. On the debit side of the picture, the following can be mentioned:

1. Although the project has been reasonably successful in promoting small industry in the $100,000—$300,000 range of capitalization, problems have

arisen when excess zeal has resulted in attempts to establish larger industries. One definite contributing factor to these difficulties has been the severe inflation in Brazil which has retarded the development of all major industrial projects. In addition, university facilities have proven often inadequate to handle larger projects.

Problems have existed in maintaining proper communication between the cooperating universities and the project area during the U.S. academic year. Language and cultural barriers have at times hampered cooperation. Training in Portuguese and English for the project participants has tended to be inadequate.

The remarkable and inspiring personality of Professor Asimow has tended to dominate the project, with the result that decision-making has often lagged during those inevitable periods when Professor Asimow has been absent.

The engineers participating in the project have, on occasion, proven themselves limited in the commercial sense. The not very surprising tendency has existed to emphasize production at the expense of marketing. An orientation toward theory, rather than action has sometimes been apparent, particularly among the host country participants. Engineers have, in some instances, shown a reluctance to depart from their narrow fields of technical specialization.

Lack of management and vocational skills in the project area has hindered the development of the new industries. In one instance, a very promising operation to manufacture particle board in Crato collapsed when the directors of the new company quarrelled as to whether to pursue the original particle board scheme or to convert the company to an oil seeds extraction venture.

ooking Ahead

Weighing the evidence obtained to date, the Asimow projects must be assed as highly successful. Clearly these projects do not and cannot serve as substitute for large-scale programs of macroeconomic development. Condering the variety of benefits from these programs and their low cost, a most bstantial return has been achieved on investment.

There is ample reason to believe, that true industrial development cannot achieved in an emerging nation without a sound foundation of small and iddle sized industry, modern industry based upon local raw materials and rving local markets. The Asimow Projects appear to provide a workable eans of promoting small industry through the introduction of the entrepreurial factor of production into a traditional society, where this essential onomic element is so unfortunately lacking. The Asimow Projects have

demonstrated the ability of, at least, a few engineers to function as preneurs, and incidently, the ability of some professors in this respect.

It is felt that the basic Asimow formula is adaptable to most dev nations, naturally subject to modifications to fit local conditions. A p designed program should be of positive assistance to the development Caribbean region.