Chapter-VI

Summary. Findings. Conclusions. Suggestions and Recommendations
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Summary, Findings, Conclusions, Suggestions and Recommendations:

6.1 Summary:

This chapter presents the summary of the study, findings obtained from the data through statistical techniques, shortcomings of the study and suggestion and recommendation in detail. It is realized that industrialization offers substantial dynamic benefits, that are important for changing the traditional structure of the developing economy, industrialization is advocated for primary products producing and exporting countries because they are confronted with lagging export demand while they have to provide employment for rapidly increasing labor force. Hence this shows why the industrialization is so important, also developed countries have industry therefore the way to become developed is to industrialize. The marginal value product for labor is higher in industry than in agriculture, to transfer the workers from agriculture to industry raises national output, the same holds good in developing countries also where the agricultural sector is suffering from agricultural unemployment. Transfer of employees from agriculture to industry resulting in adding production by them in industry, which is better than none of the form. Industrialization has got external economies where the agriculture has not, rural society tend to be stagnant, urban society dynamic industrialization brings urbanization, therefore it is better to stimulation of agriculture. The improvement of agriculture mainly depends upon the availability of manufactured inputs such as fertilizer and form machinery. In order to increase efficiency in the form one must start in the industry. The next question poses us is to how to become industrialize, the case for industrialization of developing countries is based on achieving import substitution. The success of import substitution helps a country in the production of goods, both consumer and manufacturing, in substitution of imports through the objectives of import substitution has been in practice, also industrialization and balance of payments and the policy has been rationalized by a number of protectionist arguments. The urge of industrialization in underdeveloped countries is not only to overcome the natural inferiority of agriculture or supposed necessity of industrialization to achieve a raising the level of income but also an appeal to the experience of industrialized countries. However, it is important to note that technology plays a very important role in economic development as well as industrialization. Technology is often identified with the knowledge about
machines and processes in a sense it refers to the body of “skills, knowledge, and procedures for making, using and doing useful things”. The endogenous nature of technical progress may not be so evident, but here too a number of factors suggest that while the flow of inventions may well be autonomous the rate at which inventions are applied is a function of demand and output growth, we may find that most of the developed countries have lot of inventions for their credit. They applied their inventions to machine building, iron and steel plants, telecommunications, electronics and software etc., this shows the technological and scientific growth in those countries.

From the above discussions it is worth noting that country like India, which is technologically backward cannot cope up with technologically advanced countries where there will be continuous technology up gradations also the developed countries will invest 30 to 40% of their profits for their continuous research and development but up to the Seventh Five Year Plan India does not consolidate its position for imported technology or Joint Venture strategies even if it went, that was only for specific period, when the collaborator up graded the technology it can not catch up by home country. It is realized only during the Seventh Five Year Plan how technology up gradation and transfer of technology will give an impact on the economy as a whole, hence this plan recognized the need to consolidate on these strengths and to take initiatives to prepare Indian industry to respond effectively to the emerging global challenges. Joint Venture and Technology Transfer approach will alone boost rapid industrialization and to compete in domestic as well as global markets. As Joint Venture and Technology Transfer brings, latest technology, managerial skills, process, machineries from the developed countries hence it is important mode to rapid industrialize. Hence Joint Venture have emerged as one of the most important acceptable instruments of foreign investment and Technology transfer for transactional corporations, as also from medium sized and small enterprises in industrialized countries to private and public sector enterprises in many developing countries. A Joint Venture is generally refers to a business association of comparatively long duration between a foreign and local enterprise. India also got a substantial number of Joint Ventures agreements and approvals and foreign direct investments approvals, up to the year 2000, was 6,381 and the foreign direct investment approvals was 9,986, total amount approved is rupees over two lakh crores. 33 countries were entered in to these agreements. It is important to note that United States comprised of maximum share in foreign collaboration with 21.89% followed by Germany 18.06% and United Kingdom with 14.46%.
The sector wise classification starts with electrical and electronics 21.6% which is maximum and industrial machinery 16.8%, chemicals 12.5%, mechanical engineering 11.5%, remaining others. Before spelling out the objectives, review of literature has been done both macro level and micro level. General and international studies mostly stress on technology transfer and innovations, but only restricted to technology transfer and innovations and less light has been thrown on the Joint Ventures. The micro level or national level studies also restricted to present technology and technological obsolescence, and it is restrict to study of location of industries, and related issues. Regional studies are also restricted to diversification, location of industries, process of industrialization in a very micro level, hence research gap is found and need for in depth analysis of Joint Venture and Technology Transfer is felt. The objectives set out, after research issues, were to attempt macro level analysis of Joint Venture and Technology Transfer industries and Karnataka as a micro level study, the analysis of employee potential, income generation, quality and quantity of products, process of upgradation of technology, export earnings, constraints and other related issues. Methodology and study region we have chosen Karnataka state. Karnataka today is one of the foremost industrial state in India. As it has a broad range of industries notably electronics, telecommunications, electrical, chemical engineering, computer software etc., For data source secondary data have been used to analyze the impact of Joint Venture and Technology Transfer approach for rapid industrialization. Sample design is followed with selected Joint Venture and without Joint Venture industries and used random number sampling. Key financial ratios, production function and regression analysis followed with ratios percentages etc., were used as statistical tools and techniques. Chapter scheme is discussed in detail as chapter I is introduction, chapter II is industrial scenario in Karnataka, chapter III discusses the salient features of Joint Venture and Technology Transfer, chapter IV presents the selected industry profiles, chapter V is the econometric analysis and chapter VI is the summary, findings, suggestions and recommendations.

6.2 Findings:

(l). Findings of Econometric Analysis with Key Financial Ratios:

For the analysis of financial ratios the values are calculated from time series data of with Joint Venture and without Joint
Venture industries as selected from random sampling design. Various values of financial ratios were calculated from balance sheets and profit loss account obtained from corresponding industries. Finally these values are compared with industrial averages and results were analyzed. Let us see the findings: firstly; Debt Equity Ratio with Industrial Average 1.45 is taken and When this ratio is compared with Joint Venture and without Joint Venture industries it is seen that Joint Venture industries have lower debt equity Ratio when compared to without Joint Venture Industries. In this industrial average of 1.45 is taken. Also as the debt equity ratio of Joint Venture industries are lower, the creditors enjoys much protection when compared to without Joint Venture industries. Secondly; the second key ratio, Interest Coverage ratio is compared it is seen that Joint Venture industries enjoys a good interest coverage ratio than without Joint Venture industries. This is because Joint Venture industries were running under profit when compared to without Joint Venture industries. Even without Joint Venture industries have negative ratios, which explain without Joint Venture industries shows poor performance and suffers from under utilization of resources as well. In this industrial average 4.14 is taken. Thirdly; the current ratio: Industrial Average 1.10: When this ratio is compared it is seen that both Joint Venture and without Joint Venture Industries have got fairly better ratios, this may be because of profitability of Joint Venture industries on one hand and assets of without Joint Venture Industries on the other hand. Industrial Average of 1.10 is taken. Fourthly; Inventory turn over ratio: industrial average 3.44: When this is analyzed Joint Venture industries were well above the industrial average of 3.44 of course without Joint Venture industry Mysore Kirloskar limited maintained a very good ratio but Hindustan Machine Tools and Indian Telephone Industries were below industrial average of 3.44 this is because of their poor inventory management. Fifthly; when the gross profit ratio with Industrial average 20.5% is compared with Joint Venture and without Joint Venture Industries it is found that Joint Venture industries were made profit in all the ten years of time series data but without Joint Venture industries made loss with negative gross profit ratios again this is reflecting their poor management skills, lack of marketing strategies, outdated technology, and under utilization of capacity etc., industrial average of 20.5 % is taken. Sixthly; Net profit ratio with industrial average 3.21% is analyzed Joint Venture industries shows a positive trend with positive Net Profit Ratio on one hand, negative trend observed with without Joint Venture industries on the other hand. This again shows Without Joint Venture industries were unable to make profits because of lack of competency and inward looking strategies. Industrial Average of 3.21% is
taken. Seventhly; Net income to total assets ratio with industrial average 3.52% is compared it is found that Joint Venture industries were well above the industrial average of 3.52%. Without Joint Venture industries were below industrial average and even shows negative ratios. Eighthly; Return on investment with industrial average 11.90% is compared it is found that, Here again Joint Venture industries shows a positive trend and well above the industrial average of 11.90%. Without Joint Ventures were showing negative trend and below the industrial average.

(ii) Findings of Econometric analysis of Multiple Regression Analysis and Production Function Approach:

The following is the model summary findings for the Joint Venture Industries. R Square value for Joint Venture Industries is found to be 1.000 and Adjusted R Square value is also 1.000. This means that Dependant Variable X1 That is Total Income is Fully Explained by all the Independent Variables X2, X3, X4, and X5. When the model coefficients studied it is found that the ‘t’ value is found to be positive with the value 4.122 and it is 0.002 significant which means that there is a good control over Administration Over Heads as the Technology Transfer cost is minimized through Joint Venture as the technology is provided by the collaborator. Also the cost for Research and Development is minimized as it is provided by Venture partners. The following is the Model Summary findings for the without Joint Venture Industries. R square value is found to be 0.991 and adjusted value of R is found to be 0.988 still there is unexplained parameters is found. This means that the dependant variable X1 that is total income is not fully explained by independent variable X2, X3, X4 and X5. When the model coefficients were studied it is found that ‘t’ value is found to be negative and it is −0.872 and 0.404 significant this means that administration expenses is beyond control resulting in huge losses. Also Administration expenses not only includes Research and development cost and new product design and knowledge But also facilities for welfare and other related costs.

6.3 Conclusions:

On the whole the performance of Joint Venture Companies is positive when compared to without Joint Venture industries with respect to profitability, Inventory management, return on investment and controlling of over head expenses, productivity etc., are satisfactory.
The analysis suggest that there is a urgent need tackle the problems with Joint Venture like to avoid subsidiaries, and to restrict share holding pattern to 49 and 51 percentages. Venture partners should not transfer inferior technology or obsolete technology, controlling of the company by the collaborators should be restricted as much as possible. Without Joint Venture industries must learn and practice the policies and procedures of Joint Venture industries as well.

6.4 Suggesstions and Recommendations:

Before spelling out the suggestions and recommendations it is interesting to note some of the short comings of the Joint Venture and Technology Transfer strategies. Firstly; Multinationals were reluctance to collaborate with Public Sectors, collaborators prefers to come in certain limited spheres only, and if denied entry, it would rather not come at all. Westerns have been particularly reluctant to collaborate with the public sector in India. This is largely due to ideological reasons. Secondly; Duplication of technology, excessive reliance of foreign know how may have a bad effect on local initiative. This is true in those lines where indigenous capabilities are fully developed. The result is unnecessary duplication of technology. Thirdly; Obsolete Technology: There are instances of obsolete machines or technology being passed on to the Indian partners by the foreign collaborators. In some cases, Joint Venture has been responsible for the import of capital equipment considerably in excess of normal needs. Some Joint Venture agreements have been responsible for the importing technologies not quite appropriate to the Indian situation. They have made Indian industries dependent to a considerable extent on imports of intermediate goods and parts-part of the problem of maintenance imports has been due to the promotion of such technology. Fourthly; Heavy Remittance Abroad: the rate of return on initial investment is usually very high, making it possible to recoup the amount in a relatively short period. In addition, considerable amounts are remitted abroad annually in the form of payments for technical services rendered by parent company, royalty payments etc., Joint Ventures, even when it does not fully remit any profits, demands high dividends at an early stage. A substantial portion of the earning is retained to grow cumulatively. The royalty payments, fees for technical services, etc.; increase the claim of venture capital on the scarce foreign exchange resources. Fifthly; Myth of Indianisation: Under section 29 (1) of Foreign Exchange Regulation Act, all foreign companies were required to dilute their ownership to 74%, and under section 29(2) of FERA,
the Indian branches of Joint Venture companies are to be converted in to Indian companies with non-resident interest in the equity capital not exceeding 40%. Sixthly; Absolute Power by the Venture Partner: The myth of indianisation can be observed from fact that the parent company will have the absolute power to appoint the Chairman and the Managing Director of the Indian Company. This power will remain with the parent company even if the dilution of shareholding is pushed to the level of 25%. This minority participation has not altered the controlling position of the parent company. Seventhly; Use of clever instruments by Venture Partners: The rates of taxation on private limited companies in India are higher than those on public limited companies. After indianisation, the multinational companies will enjoy the status of public limited companies and consequently, their tax liability will be reduced. Out of these tax savings the multinationals are able to pay the Indian partners of these companies. In other words, it is the Government of India who bears the brunt of Indianisation and not the multinationals. But by introducing a wide dispersal of ownership, the multinationals are able to blunt significantly the political opposition towards them. In this sense the Indianisation is being used as a clever instruments to change the business environment in favor of multinationals. Eighthly; Heavy Economic drain Carried away by Subsidiaries: To camouflage their activities, the multinationals are rapidly converting their Joint Ventures in to subsidiaries. The profit ratios in subsidiaries are much higher than those in the branches of Joint Ventures. In other words, foreign interests are sought to be served while keeping the Indian mask. Since the majority of branches of Multinationals are engaged in commerce, trade and finance and export of tea, there is hardly any evidence of transfer of technology.

In the light of the above discussions of Joint Venture and Technology Transfer we are suggesting following strategies to over come the shortcomings, we are introducing a new concept called as Venture Economics or Venturomics which deals all the possible ways to over come the shortcomings.

6.5 Introduction to Venture Economics or Venturomics:
What is Venture Economics or Venturomics?:

It is defined as “Branch of Economics which deals with Joint Venture and Technology Transfer strategies for increasing profitability, skill formation, up gradation of technology, capturing export markets, maintaining healthy
balance of payments, thereby competing in the global markets, for rapid industrial development and reducing monopoly of multinationals”.

6.6 Need for Venture Economics:

It is evident from the studies most of the developed countries invested in India is in the extractive industries like, oil, copper, iron ore (Kudremukh Iron Ores Limited in Karnataka), cobalt, rubber, bauxite, uranium and other minerals, very little capital is invested in manufacturing facilities with the result that the underdeveloped countries like India fail to acquire the skill necessary for development as the things stand.” They sell their oil, and minerals under the conditions favorable to the buyer and purchase finished goods on terms favorable to sellers with predicaments aggravated by the ocean shipping conferences which are prone to rig transport rates in a fashion that still further advantageous to the rich nations”

It is interesting to note that the U.S.A. one of the most developed countries its assistance to India is mostly confined to consumer goods. The production of luxury consumer articles and their proliferation created a demonstration effect, which create undesirable consumer tastes, and distorting the direction of private investment. This has adversely affected the demand pattern and promoted a culture based on consumerism. There has been technical collaboration in garment making, sanitary ware, ice creams, cosmetics, roof tile making, porcelain, soft drinks, and the crockery and the like which correctly speaking have not been of any significance in the process of industrial development. Also U.S.A did not render any help to India for building to heavy industrial base, this is particularly true in India’s Public Sector Undertakings. India not only paid prices for the goods purchased from developed countries except USSR aid programs but it also paid extremely high freight charges. “Recent investigations showed that prices paid for commodities under tied aid have been as high as 40 to 50% above the international prices.

Freights on the US flagships under tied aid credit is 43 to 113% above the lowest quotation of international shipping agencies.2" The general laws governing the development of capitalism work changes in the position of various countries and tend to preserve and even widen the gap between, the economic, scientific, and technological level of the developed countries on the one hand and that of the developing countries on the other. The policies of the industrially developed countries and the system of international economic relations molded on the basis of western theories are not intended to solve the vital problems facing newly free states, moreover, the unequal positions of these states in the capitalistic world economy is preserved. When the capitalistic system dominated the whole of the world, intersection between countries characterized by the different level of development usually boiled down to outright exploitation of the weaker sections by the stronger ones. The foreign investors, are above all looking after their own interests, which are to gain access to source of raw materials, to markets and cheap labor. The capturing of internal markets for finished products by foreign business has been inhibiting the development of local processing industries. In most cases foreign enterprises have no strong ties with local national industries.

6.6. International Business and Joint Venture and Technology Transfer:

International business is usually defined “as the transfer of factors of production owned by organization across national borders, or the transfer of that organization across national borders (Agman, 1989). Technology transfer on the other hand, refers to the application of technology to a new use, or to a new use, or to a new user for Economic gain. (Gee, 1981)." Joint Venture and Technology Transfer is generally thought of as being product embodied, process embodied, or person embodied, that is Joint Venture and Technology Transfer can be said to occur through the specific transfer of products process or people. Joint Venture and,

“2.T.N Nagireddy India Mortgaged Tirumala Nagi Reddy Memorial Committee, 1978.2”.

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Technology Transfer are conceptualized above, then appear to be the core, the heart of international business, we can, and do, have processes of Joint Venture and Technology Transfer within national borders. However when it comes to international business, Joint Venture and Technology Transfer is fundamental to the accomplishment of international business. Moreover, the success transaction under consideration frequently depends on the effectiveness of the Joint Venture and Technology Transfer embodied in that transaction.

6.7. Is Joint Venture and Technology Transfer is Crucial to Business Community?:

The twin concept of Joint Venture and Technology Transfer share some additional overlaps. Both are crucial to the business community, yet, they are extremely complex issues involving, economic, political, social, and cultural factors. When issues of complexity emerge. As is the case of Joint Venture and Technology Transfer simplifying assumptions and frame works are usually sought to help explain the complexity from a simplified model, implication can be then be derived for research or practice. Very often those implications are derived using mathematical techniques, and later those implications are related to some observed reality. This represents the Inductive Approach in science. An alternative approach, the Deductive Approach, begins with the observations, and then additional observations are sought to help confirm or reject initial hypothesis. Some times that initial observations is a case study of one particular phenomenon, from that case we can seek to generalize findings to a whole group of cases. Thus, learning occurs through a step-by-step process. The literature on technology transfer and joint venture and international business relies heavily on the second approach or the deductive approach.

6.8. Venture Economics is it a Global Phenomenon?:

Globally, companies have negotiated varied forms of partnering for mutual advantage. The reasons driving business alliances are indeed many. The need to enter to penetrate new/origin markets. (Motorola with Toshiba to enter Japanese semi conductor market) is one. Another is to share there the risk of Research and Development (IBM and Fujitsu to develop super computers). American car majors tied up with Japanese car
firms in mid 80’s in Detroit, because of the farmer’s inability to outsell the latter’s products.

Yet others desire to bridge yawning technological gaps like NEC’s alliance with several firms in telecom and semiconductors generally to reach a position of preeminence developing a source base especially for inexpensive products and need for continued mutual dependence have also been observed to be causes of Joint Ventures. Hence “Indian firms who have for any reason been hesitant in entering Joint Venture are doing so at their own long term disadvantage”. Further, what is more important in an alliance is to manage the entire affair strategically and successfully, which by nature has medium to long term implications. Joint Ventures should be seen in the light of firms long term goals. It is potential life has to be gauged along with the learning objectives on prioritized basis. To actualize the set of goals, ventures rationale as well as the modus operandi should be identified right at the beginning. What each partner bring at the venture will determines its life. If the foreign partner realizes that it alone is adding value to the Joint Venture and the local partner is only encashing the gains. Then it results in mergers and acquisitions by one of the partners considering the passengers car industry FIAT took over by the stake of PAL; similar was the case with Mercedez Benz, Ford, Honda, and Daewoo. Indian companies too have engaged in such activity though not in capital and technology intensive car industry but other industries like Wipro bought out the 45% share of Acer, its Joint Venture Taiwanese partner. The same was done by HCL to HP. Tata Telecom to Bell Canada, Bajaj Electricals to Black and Deckers of USA, and Godrej did to GE Appliances.

6.9. Venture Economics and Indian Partners:

In the ultimate analysis, “Indian partners must master the game of the partnering through Joint Ventures.” By itself it is an excellent tool to achieve business success but it comes like “Rose with Thorns”. It is evident from the forgoing discussions that the Joint Venture partners enable local firm to learn. However what should not be lose sight of is that eventually the international partner is also a potential competitor, therefore, even as the Joint Venture is contemplated, it is essential to make a correct choice of the partner to avoid all future debacles. Speaking of ground realities, despite the numerous path holes that are present enroot, virtually no firm which intends to be a players in the global market, can run away from the challenges of business collaboration and Joint Venture. It is impossible
to spend competition in all areas. This makes strategic alliances necessary for companies, especially the speed and quantum of learning while in it. At the end of the day business success is a function of constructing new process capabilities, Launching new products successfully and continuously and penetrating markets/segments/globally, it will not be a over statement to say that strategic alliances can be a low-cost strategy for achieving all these three.

6.10. Venture Economics Strategies for Joint Venture and Technology Transfer:

Every Joint Venture should convey to the transferee the knowledge, experience and skill necessary for: Firstly; Sturdiest Plant: Eco Feasible: Setting up of the sturdiest. But at the same time economically feasible plant or facility for production and/or generation which is easy to operate and maintain. Secondly; Capturing local and Foreign Markets: Producing or generating in them planned goods and services in a manner capable of capturing the local and foreign markets within the shortest period of time and sustainable against growing competition. Thirdly; No passing of inferior goods Technology: While the level of sophistication of the technology should be determined with reference to the type of demand and the competition that the transferee product is likely to face from others, the transferor should not deliberately pass on inferior goods technology to the detriment of the transferee.(The transferor should indeed ensure that the nuclear waste and environmental degradation are not dumped on the transferee along with the technology. Fourthly; Subjected to continuous Research and Development: The technology under transfer must have been in use for some years in the industrialized part of the world and thus subjected to continuous R and D and continual improvements based on experience of the users. The benefit of all those developments and experience should be made available to the transferee. Fifthly; Unconditional Guarantees: The Joint Venture must include the transferor un conditional guarantee for (i) Fault less operation of the plant. (ii) Quality and quantity of output of the end product for an agreed minimum duration of time, linking any shortfall guarantees to reasonable amount of liquidated damages, or of replacement cost; (iii) Guidance in operation, adoption, local R and D and improvement of technology; and, (iv).Any other support, guidance, or guarantee which the transferor is able to give to make the Joint Venture complete flawless and the latest. Sixthly; Skills required by Transferee: A great deal of skill is necessary for the practical application of
the new technology in a project, its absorption, modification and adaptation to local condition; future improvements through R and D and possible licensing to others in developing countries. The skilled men delegated by the transferor for the one-time application and implementation of the project must train the transferred personnel in the application of the technology. Seventhly; Training for Transferees Men: The Joint Venture agreements should provide for training of sufficient number of the transferees men in the transferor’s design office operating plants in which technology is in the use, and in the factories where the selected production equipment manufacturing takes place, besides advanced project site where the technology is being used; setting up a similar plant training in plant operation and maintenance is vital. Eighthly; Optimization of Benefits from Joint_Ventures: The need for Joint Venture to import technology in a developing economy is unexceptionable. The relevant question in this regard is the optimization of the benefit from the Joint Ventures, keeping the foreign exchange burden at the minimum possible level. The pattern of subsidies which were the major components of the Joint Ventures does not provide optimum results, rather they try to proliferate even in non essential conspicuous consumption industries. There is an excessive effort by subsidiaries to drain out resources by sending a large contingent of personnel under the garb of technical personnel. Being the lenders of the capital, they are successful in using their superior position to foist mediocre and some times sub-standard personnel parading them as experts. Such attempts by multinational corporations should resisted because they impose unnecessary foreign exchange burden. Moreover, the time period during which technology should be absorbed by the Indian personnel should be considerably reduced. A rather, sluggish attitude has been observed both in the private and public sector. For this, a quick transformation of subsidiaries to minority companies is called for. There is also the need for screening the areas in which foreign collaborations have completed their task of transfer of technology. Such industries should be indianised both in terms of management and control. Ninthly; Carving out policy of Selective Licensing for Joint Ventures: The government should carving out policy of selective licensing of Joint Ventures, the government, in its over enthusiasm to attract foreign capital, permitted foreign firms in low technology consumer products such as cigarettes, boot polish, chewing gum, cosmetics etc., Recently, the government permitted foreign producers of batteries to expand their production so as to produce marine products, cigarettes, and also enter hotel industry. Although the government assumed powers under the Foreign Exchange Regulation Act, 1973 to direct a foreign company holding a
majority of shares in an Indian company to quickly bring down its share of equity capital to 40%, no concrete results could be obtained due to double-think and double-talk in government circles, namely, to woo foreign capital as also to squeeze it.

Finally, from the above discussions it is clear that Indian companies should master the Joint Venture and Technology Transfer strategies so that it can control the monopoly of the multinationals, wherein multinationals use our labor, land, power and other important infrastructure and en cashing the gains and transfer it to their countries as well. The government should also join hand and encourage domestic industries to grow rapidly. Instead of having Joint Ventures and Technology Transfer locally, our industries should become multinational overseas, and must start Joint Venture abroad. The Venture economics or Venturomics back up these strategies, and develops more and more concepts, new theories, and hypothesis, and econometric models.

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