

Joynal and Mizan (J.M.) Model for Cluster Development

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Abstract

Cluster is a geographical location (5 km radius) having 50 or more manufacturing or service providing units of interrelated and interdependent firms along with their backward and forward linkage industries. Manufacturing or service providing firms are co-located and experience unique strengths, weaknesses, opportunities and threats in a cluster. Clusters could be naturally grown due to the availability of raw materials, skilled labor, historically inherent professional uniqueness etc. reasons. On the other hand government or concerned agencies may establish a pre-planned co-located cluster of a particular sub-sector in a specific place. Where firms are co-located and linked with each other through the value chain of a particular product. Clusters, either naturally grown or man-made, require development interventions in different phases to perform better than its existing situation. Cluster development interventions could be different based on specific needs of a cluster. Implementation modalities of cluster development interventions could be different due to the explicit features of a cluster. There are several models for cluster development offered by different international bodies, expert groups, practitioners to guide clusters into a particular benchmark of development. The J.M. Model for cluster development was offered by both the authors to guide cluster managers toward success in a challenging environment. This model was initially offered by the authors through their publication titled "Cluster Development Models: Challenges and Opportunities" published by the International Journal of Economics, Finance and Management Sciences. It comprises of five phases and twenty one steps for comprehensive development of a selected cluster. The J.M. Model for Cluster Development is described elaborately here in this article for better understanding of the cluster managers, practitioners, academicians and other relevant stakeholders.

Keywords: J.M. Model for cluster development; Cluster development model; Cluster development process; Steps and phases of cluster development; Different steps of cluster development

JEL Code: C38; O14

Introduction

Many least developed countries (LDCs) including Bangladesh wants to foster economic development through entrepreneurship development. Because it is one of the most powerful means for employment generation, new employment creation, increasing GDP growth, export earnings and finally poverty alleviation. Governments are trying to promote enterprise development, industrialization for the same reason. But they have limited resources to deploy after taking care of basic needs like foods, clothing, housing, education and healthcare facilities to the mass people. As a result, scarcity of budget allocation or inability to mobilize entrepreneurship development is a common phenomenon in almost every LDC's.

It is difficult to provide all industrial logistics including lands, electricity, gas, water, infrastructure to 100 enterprises located scattered all over an Upzilla. But government could easily ensure these industrial logistics into a particular location for the same number of enterprises. At the same time it is difficult for the revenue collectors to collect tax and VAT from 100 small enterprises located at different parts of a town than collecting the same from a particular location. Business cost is much lesser in a co-located industrial cluster than that of the scattered located industrial environment. Therefore cluster based enterprise development concept is becoming popular around the world [1].

Problem statement and research questions

Cluster based industrial development is a comparatively economic, swift, comprehensive and result-worthy method for entrepreneurship development, employment generation, increasing GDP growth and export earnings. But, what is a cluster? How a co-located industrial cluster could be established? Or, how a naturally grown cluster could

be further developed? What are the steps of cluster Development? How many processes involved in cluster development? etc. All of the above mentioned questions will be focused and answered here in this article.

Objective

Objective of this paper is to describe the J.M. Model for Cluster Development elaborately to make it easy to understand for the cluster managers and practitioners. Helping the stakeholders to initiate and implement cluster development activities successfully in any economies of the world especially least development economies.

Methodology

This paper is the result of a number of SME Cluster development initiatives in Bangladesh. Experiences of "SME Cluster Mapping" study in 2013 and "Needs Assessment for Cluster Development" at 30 SME clusters located at 30 districts of Bangladesh. Secondary materials were collected and analyzed to identify a suitable cluster development model. As we have experienced difficulties to adopt any of the models completely here in Bangladesh then we have decided to offer a new model based (J.M. Model for Cluster Development) on the needs assessment results and a series of focus group discussions (FGD) and key informant interviews (KII) with the stakeholders.

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Scope of work

The authors are two key members of SMEF cluster development team. Having experiences to identify and map SME Clusters. Conducted Needs Assessment for SME Cluster Development at different SME clusters of Bangladesh. The authors were engaged with conducting Censuses and Surveys at various SME clusters. Both the authors have analyzed most of the available models for Cluster Development and offered this J.M. Model for Cluster Development to foster cluster based SME/enterprise development in any LDC like Bangladesh.

Limitation of this study

Main limitation of this model could be the uniqueness of it. It is still in the primary stage of implementation. After completing every steps in some clusters we may have to think of revision for this model. But it will take ten to fifteen years to complete the whole process in a cluster and identify the improvement opportunities of this model. But this model has flexibility to adopt any new component or changes as and when required. With all potential limitations in mind till now, we believe that, this model can guide cluster managers/development agencies/authorities toward successful development of a cluster based on predetermined benchmarks.

Literature review

Michael Porter who is recognized as the founder of industrial cluster concept defined cluster as a “Geographically proximate group of interconnected companies, suppliers, service providers and associated institutions in a particular field, linked by externalities of various types” [2]. Clusters contain a mix of industries related by knowledge, skills, inputs, demand, and other linkages. United Nations Industrial Development Organization [3] defines industrial cluster as: “Geographic and economic concentration of manufacturing activities which produce and sell a domain of interrelated and complementary products and having common problems and opportunities” [4]. Cluster could be defined based on different parameters like activities, origin, size wise, technology wise, linkage wise, market wise, state of development and based on entrepreneurs etc. For example manufacturing cluster

or service providing cluster, naturally grown cluster or man-made cluster, growing cluster or declining cluster, export oriented cluster or domestic market based cluster etc. parameters could be used to define nature of a cluster.

Cluster development practitioners introduce several models for cluster development. Notable models for Cluster Development includes, the UNIDO [5] Cluster Development Approach-1 and 2 offered by the United Nations Industrial Development Organization [6]. Five Phase Twelve Steps Model for Cluster Development offered by the Cluster Navigator – New Zealand [7]. Cluster Development approach in Republic of Croatia offered by Maxwell Stamp Plc. [8]. Cluster Development Model offered by the International Trade Department, World Bank [9]. Cluster Map of an Agri-business cluster offered by the World Bank. Cluster management strategy by the European Cluster Observatory [10]. Cluster Based City Economic Development Concept offered by the ADB [11]. Besides these there are contributions of Cluster Plus – India, TCI Network – USA in cluster development models. None of the above mentioned model is fully implementable in a least developed country like Bangladesh. Having limitations in financial, technical knowledge, technological, managerial capacity to dedicate for cluster development etc. With all these limitations in mind the authors would like to propose a pro-poor, flexible and equally effective in any least developed country and developed economies as well model (J.M. Model for Cluster Development) for cluster development. This model is offering a pro-poor, comprehensive and flexible guideline for developing clusters around the world irrespectively in a developed or developing or least developed economy.

Joynal and Mizan (J.M.) model for cluster development

This is a model to guide cluster development authorities/practitioners/cluster managers to develop a newly identified cluster or develop a cluster in a particular location. It includes 5 phases and 21 steps from identification to making the cluster self-guided. J.M. Model for Cluster Development is as follows [1] (Table 1).

Phases	Phase-I Identification and Mapping	Phase-II Cluster Analysis	Phase – III Intervention Designing and Piloting	Phase-IV Implementation and Monitoring	Phase-V Networking and Evaluation
Steps	1. Defining cluster as per national stage of industrialization, 2. Identify cluster's location in countries administrative map 3. Educating Stakeholders with the cluster development process 4. Developing a database with cluster information	5. Collecting data regarding cluster's existing features, development barriers, potentials etc. through FGD and KII. 6. Preparing Cluster's Resource Map. 7. Prioritizing cluster's development barriers. 8. Listing problems as per short, mid and long term basis.	9. Designing development interventions to solve/ overcome the barriers. 10. Identifying concern agencies to take the lead. 11. Piloting a cluster with identified interventions. 12. Monitoring outcome. 13. Revising/ updating the list of interventions as and when required.	14. Implementing determined interventions at a cluster. 15. Monitoring output 16. Fixing benchmark 17. Initiative for further value addition 18. Preparing leadership groups for future course of action.	19. Networking with local and international stakeholder organizations. 20. Evaluating progress and taking corrective measures. 21. Handing over the leadership into the leadership group.
Outputs	Latest database of Clusters across the country	Updated information about the problems and prospects of each cluster.	Cluster Development Action Plan	A growing/developed cluster	A sustainable and well established cluster with value chain linkage
Source: Abdin MJ, Rahman MM Cluster Development Models: Challenges and Opportunities, International Journal of Economics. Finance and Management Sciences 3: 358-366. [1]					

Table 1: Joynal and Mizan (J.M.) Model for Cluster Development.

Phase-I: Identification and Mapping

The first phase of this model starts with the identification and mapping of clusters across the country's territory. This can be initiated first by constructing and adopting an acceptable and applicable definition of cluster in the context of that country's socioeconomic condition. After that the administrative map of the country will be used to identify the naturally grown clusters across the country by using suitable communication method. Government authorities has vital role in assisting the cluster mapping process as there are many mechanisms where govt. can work with private firms for locating and gathering information. The identified clusters are to be screened out as per the adopted definition. Cluster members have to put their inputs in the development process. Thus a final database of clusters countrywide with all elementary information will be constructed at the end of this phase. Phase-I involve the following four (04) steps:

Defining cluster as per national stage of industrialization (Step-1)

Clusters can be defined based in various terms like as occupancy of geographic area, number of entrepreneurs within the cluster, volume of gross production and revenue generated annually, type of business in the cluster, nature of supply chain network, cultural, religious or social groupings etc. Although the clusters are to be defined as per the macro economic conditions related to industrialization of the concerned country such as the scale of industrialization, expansion of industrial proximities, scale of investment in manufacturing of the country and so on. In such way, considering the factors and based on the industrial economy an acceptable definition of cluster has to be adopted.

Identify cluster's location in countries administrative map (Step-2)

After all ways acceptable definition of cluster in hand the identification step has to be followed. This can be done with the help of the Country's administrative map. Division of all geographic location should have contained clusters of various industrial activities. Newspaper, Local Govt. offices, Journalists, Businessman, Local Development agencies etc. can be the source of information on the presence and location of clusters on that divisional area. According to those information, the clusters are to be visited physically for verification and finally listed with some elementary information like Name and address, Products/ Service description, no of entrepreneurs, communication directions, trade body, supply chain, raw materials, types of machines used, general market data and other information as far as possible. This data can be used as baseline data in future for progress tracking and used to build up KPIs for interventions. The more quantifiable date could be collected the better.

Educating Stakeholders with the cluster development process (Step-3)

The stakeholder of a cluster may include entrepreneurs, suppliers, marketing personnel, labors and maintenance workers, local govt. officials, teachers, trade body representatives, journalists and other professionals etc. They have key role in the development process of the cluster. Hence, the stakeholders are to be engaged into the development strategy for selected cluster. To do so, first there should be communications and informal discussions between stakeholders and cluster development authority on planning, strategy set up, availability of cooperation, mutual benefits etc.

Developing a database with cluster information (Step-4)

In this step, all the elementary information on clusters being in hand, a concrete database has to be built. A common format has to be used to describe each identified cluster. There should be clear indexing system to easily seek for a cluster information according to category like as location in administrative map, product/ service type, size of cluster, cluster by founding period, exporting or non-exporting, rising or declining cluster and many more as categorical as it can be. With all the collected background data for each of the clusters, there would be a basic prioritizing of importance based on cluster size in terms of number of entrepreneurs, area, investment volume, production volume, employment ratio etc. This database has to have an upgradation period of say 05 years.

Output of Phase-I: Latest database of Clusters across the country divided into categories to find out information easily and conveniently. The database has all information verified and which will be regarded as the base data for all future activities.

Phase-II: Cluster Analysis

The cluster analysis phase comes up with in depth study on selected clusters. However, selecting the right cluster to start the initiative with is a very critical issue. But clusters can be selected based on leveraged existing activities and business environment strengths [12]. Priority would be given to the clusters which came first by screening in step-04. This study may be combined with census, interviews, surveys and other statistical tools. There would be a sketch up on the clusters' resource map which reveals the pertinent economic features for a selected cluster. In the end of these studies, the barriers and opportunities of development are listed, sorted, prioritized and categorized according to short, mid and long term goals.

Collecting data regarding cluster's existing features, development barriers, potentials etc. through FGD and KII (Step-5)

At the very beginning of the cluster analysis phase, the step 5 focuses on extensive rapport build up with the stakeholders of the selected cluster. There would be focus group discussions (FGD) with cluster members which include entrepreneurs, trade body representatives, supplier and buyers, intellectuals and professionals who are related to appraisal of that cluster. Also, there should be key informant interviews which targets persons who are learned and acknowledged about the cluster's SWOT for long and better than anyone. This step will bring about the differential features, general business environment, supply chain, role players, barriers of development, hidden opportunities, and urged development needs of the concerned cluster.

Preparing cluster's resource map (Step-6)

Resource map is a graphical information bank that represents data about each active player operating the Clusters' either from inside or outside of a cluster. It is to be built with the information gathered in step 5 in such a way that, it can be easily understandable. The map includes raw materials suppliers, machineries and tools suppliers, technology and maintenance support suppliers etc. located at the left. Also the marketing agents, packaging, transporting service providers, finance providers, public relations etc. are shown at the right part of the map. At the top, the local and regional govt. institutions that support the activities of the cluster are placed. At the bottom, education, training, technological and business research providers of the cluster are plotted. The middle part of the cluster map focuses on the manufacturers and

processors, lead role players and sub-contractors etc. who are directly involved through the conversion process. Actually this map gives us complete overview on the operational framework, overview on active network players and external service providers of that cluster [13]. A typical example of agricultural processing cluster resource map can be shown as follows (Figure 1).

Prioritizing cluster’s development barriers (Step-7)

A naturally grown or initiative based planned cluster may have many barriers for a smooth development. As a matter of fact, all development initiatives need proper time to complete and all barriers of development can’t be addressed simultaneously. Hence the barriers identified, has to be properly prioritized based on some factors. These factors include the measurement of impact of resolving a problem in terms of economic and social benefit that it may bring for the cluster. Also the barriers easier to understand and solve are to be given top most priorities. It is possible that some barriers can be flagged not solvable for the current period and considered for future development projects.

Listing problems as per short, mid and long term basis (Step-8)

Prioritized problems carry definite goals with them. But all are no to be addressed in same time range. Some should come first in considerations, some are dependent to another. Hence, the goals are divided into shot, mid and long terms. Generally, the short term goals are achievable within 3-12 months. Midterm goals need 12 to 36 months whereas long term goals can take 36 to 60 months to address. Most importantly, all the goals are to be specific, measurable, attainable, and relevant and time bound (SMART).

Output of Phase-II: The output expected from this phase is updated information about the problems and prospects, the complete resource map for each cluster and enough background knowledge for intervention design based on the prioritized cluster problems and needs.

PHASE – III: Intervention Designing and Piloting

In this phase of cluster development, with all analyzed data and

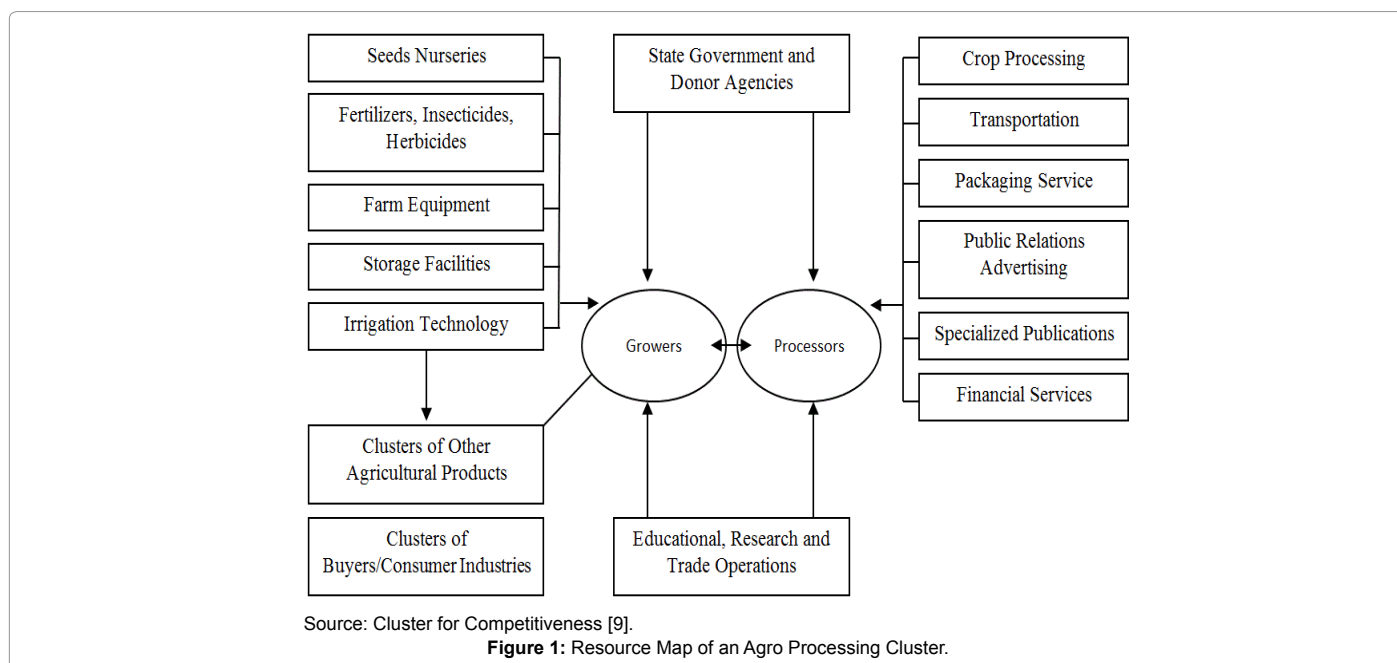
known factors of improvement, the cluster development agent will design various interventions targeting the resolution of identified issues and new development projects. Although the interventions are to be taken under implementation only with necessary involvement of implementation authority. Prior to go for full phase implementation, there need to be necessary piloting for verifying the applicability and effectiveness of interventions. Implementation activities will be monitored for measuring progress and making necessary adjustments. Every intervention will be time bound and each cycle of similar interventions will come up with revised framework for more effective outcome.

Designing development interventions to solve/overcome the barriers (Step-9)

With the clusters being properly analyzed and the problems and prospects are being sort out, there need to be measures for addressing those problems. The measures include interventions related to infrastructural and institutional development, financial support, technological upgradation, human resource development by skill sessions and on the job training, tracer study of growth and so on that may apply. Interventions’ applicability and effectiveness for solving real world problems can be problematic to justify, but proper brainstorming can help overcome. All the designed interventions are focused on time bound short, medium and long term goals with the problem statements properly defined. Each intervention has to target in achieving justified value of pre-defined KPIs at the end of the implementation term.

Identifying concern agencies to take the lead (Step-10)

As the interventions designed are of various discipline in nature, each of these need to be handed over to proper agency/ implementation authority for taking the lead. Intervention leadership is of top most importance as this will define the rate of success at the end of the day. The knowledge pool and expertise of the intervention authority have to be at required level to come up with lower risk of failure. Leading authority can be a cluster development agent, or a department of concerned discipline, Govt. or Local organizations, NGOs or Financial



institutions, Training academy or a department of Government for concerned development works.

Piloting a cluster with identified interventions (Step-11)

Piloting is very important for making sure the effectiveness and applicability of a designed intervention for a definite cluster. Some interventions may seem appropriate and the output may found to be very much necessary for the cluster, but can come up with failures right at its piloting state. Some may success in piloting for an individual cluster but may bring failure for another one. Considering all these facts, prior to implementing in full phase, all the interventions should begin with a proper time bound piloting and if success follows, to the full phase implementation. Although piloting will help decide in making necessary corrections and adjustments in the design of the intervention.

Monitoring outcome (Step-12)

Monitoring here actually means keeping the track of pilot projects for necessary interventions. It can be done by assessing the increase or decrease in KPIs, physical observations, interviewing the cluster members and graphical performance monitoring [3]. Monitoring results will help us make to re-design, adjust, correct or improve the intervention designs.

Revising/updating the list of interventions as and when required (Step-13)

This step simply helps to decide the revision or update needs for the intervention designs based on the piloting outcome. In this way, perfection can be achieved and an effective number of interventions can be found applicable for the cluster development. Interventions from all disciplines will combine into a complete action plan practically applicable with achievable effective results.

Output of Phase-III: This phase intends to produce the final and refined version of cluster development Action Plan. This plan will be the base line of the development of initiatives for every cluster. There would be enough flexibility for making necessary alteration of any type for the sake of increased effectiveness and applicability of this action plan. This will enable the continual improvement of the action plan in flow with development economics. After this plan, real implementation stage will begin.

Phase-IV: Implementation and Monitoring

This phase will turn a cluster into a fast growing cluster having remarkable momentum of development. With a proper cluster development action plan, the implemented interventions will continually improve each cluster's performance specifically economic, social, and environmental, productivity and quality, human resource development, market expansion and so on. All the outputs from those interventions will be regularly monitored and measured for further improvement and modification. The performance of clusters will also be benchmarked with some successfully established clusters located locally or internationally. Also the phase will have significant focus on further value addition through the entire value stream of the cluster and build up a leadership group capable enough to take over the responsibilities to carry out the development process of the respective cluster keeping the vision intact.

Implementing determined interventions at a cluster (Step-14)

Actual momentum of cluster development will get at its peak

with the implementation of determined interventions from cluster development action plan. These interventions are targeting either to resolve cluster's existing and future problems or to make improvement of exiting situation or to achieve a desired level of KPIs. Interventions are of different disciplines as of mentioned earlier and has time bound objectives to achieve. Implementation role players i.e. agents were already settled and gone through with the piloting intervention-wise. So this step starts the actual implementation of designed interventions according to the final cluster development action plan at full pace and involves all the stakeholders in this process role-wise.

Monitoring output (Step-15)

As the implementation goes on, a monitoring team will be formed to continuously monitor the progress of implementation. Monitoring should always be aligned to the comparison of achievement of objectives and according to this, criteria for progress tracking has to be developed. The team can perform their activities at end of small milestones of each intervention or periodically as the development progresses. There will be necessary tools and equipment for collecting data while monitoring upon the brainstorming and discussion of applicability. It is expected that the monitoring data conforms the effective implementation of the interventions to impervious growth of clusters' macro-economic and social condition.

Fixing benchmark (Step-16)

Benchmarking is a process of comparison of performances between or among two or more subject matters under similar circumstances and conditions. Cluster growth performance with respect to individual interventions as per the implementation by KPI data has to be compared with local or internally situated clusters for that similar interventions to get a mark of baseline performance standard. There would be many criteria to compare and each criteria will give best upper or lower values for any KPI based performance scale. The best performance score will be the benchmark for a development initiative for further continuation. It will establish a standard performance scale for clusters across the country or even the globe for a definite intervention what will be performance goal to achieve at the end of the intervention. There are several benchmarking tools used in many cluster initiatives in Europe base. Such tool can be helpful for going for the local cluster benchmarking.

Initiative for further value addition (Step-17)

All clusters has a natural set up of value streams since form the establishment. But as the value stream is not efficient enough, there will be more and more opportunities for further value addition. This will increase profits, increase employment and make the value stream more stable. Integrating backward and forward linkages into the cluster's value chain is a better way. Other may find non-value added activities and wastes and remove those gradually to increase value addition process efficiency of that cluster. Also, introducing innovation initiatives by starting innovation centers such as RandD and intermediate services such as designing, prototyping and intellectual property reservations etc. can foster the value addition process a way further [14]. Other than adding more fruits to the basket, its rally hard to become competitive in global market economy.

Preparing leadership groups for future course of action (Step-18)

Cluster development is a continuous process and the leadership of cluster members can only make the process stable. Also, the whole

process is initiated and nurtured by cluster development agent with the necessary participation of cluster members. With the course of time, the clusters' entrepreneurs and leaders will become skilled enough to handle this continuous development process. This motto is built within the cluster development strategy right from the beginning which can only become operational by correct engagement of potential leadership groups into planning, designing, implementation, monitoring, evaluation, restructuring and many other processes of cluster development.

Output of Phase-IV: At the end of phase IV, it is expected that the cluster will be at stronger growth potential and renowned as a fast growing / developed cluster across the country and world as well. Also, both supply chain network and market will be at their most stable state. Interventions with induction of modern technology and skill education will make the cluster a model of successful cluster with appropriate development strategy to follow.

Phase-V: Networking and Evaluation

In this final phase of development clusters will be enough matured to enter evolution with distinctive economic features at a higher scale. Supply chain network will expand over the national boundaries and stakeholders from both local and international communities will continuously increase in number and integrate into the development frame. The cluster development agency and implementation authority will evaluate the stage of development until they find that opportunity and scope for handing over the leadership to internally established leadership group.

Networking with local and international stakeholder organizations (Step-19)

Clusters as they grow with immense economic growth potential with well-established supply and market linkages, more and more local and international stakeholders need to be conglomerated within the network for gain share. Many development partners, financial organizations, NGOs, Academic and Research Partners, Local and International Corporate groups, Business cartels and MNCs etc. are some example of such stakeholders that creates global value chain linkages [15].

Evaluating progress and taking corrective measures (Step-20)

In this step, the cluster development agent will perform a cross platform i.e. social, economic, environmental etc. evaluation of the entire development progress right from the beginning till phase V. According to the evaluation there might need some corrective measures for some key principle of cluster development strategy. Also the evaluation will give a pathway to be ensured about handing over the lead of cluster development to the locally developed leadership group.

Handing over the leadership into the leadership group (Step-21)

The final phase of cluster development has enormous indications in favor of the cluster to be at its most enriching features of development. As this is been known all over the world as a role model of cluster based economy, the development will go on with progress with its in-built momentum of growth potential. More and more other clusters from around the world will be integrated into the system and as the days go by, it will be more and more matured. Hence the lead of development procedure has now the time to be handed over to locally developed cluster leadership group for continuation of its growth.

Output of Phase-V: There will be strong level of vertical cooperation along the value chain where the enterprises will perform complementary tasks of the same production process [5]. And the rise of inter-personal trust and vocabulary sharing because of repeated interactions facilitates will enhance the flow of knowledge among the enterprises and it will emphasize the scope for specialization in the use of all inputs. It will result complete agglomeration among the cluster members as well as forward and backward supply chain networks. The phase V cluster will provide a complete lesson learnt and hands on experiences on cluster development for the development agency that will be followed for the development of other clusters across the country.

Justification

There is a long list of models for cluster development. But none of these are comprehensive with detailed description of activities, inputs, outputs etc. The Joynal and Mizan (J.M.) Model for Cluster Development is designed to guide a layman cluster manager from beginning to the end without any confusion. There is enough space for evaluation and adoption of new measures as and when required.

Conclusion

Joynal and Mizan Model for Cluster Development is a new model proposed by both the authors of this article. Authors are confident that this model can guide cluster managers from beginning to the end without any confusion. It has enough flexibility to address any new issue and take corrective measures as and when required. The model is equally applicable at developed or least developed economies. It describes specific object oriented output in each of the phases to measure effectiveness of the initiative.

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