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INNOVATIONS THROUGH VIRTUAL ENTERPRISE: A CASE STUDY FOR MSMEs

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Abstract: Micro, Small and Medium sized Enterprise (MSME) are the backbone of any country's economy. In today's turbulent environment, MSMEs need to bring innovations in their products and processes so as to cater the customers in effective and efficient ways. But they lack necessary resources and skills to compete with large organizations. Therefore MSMEs have to collaborate with each other to form Virtual Enterprise (VE) through which they can share information, resources, risks, responsibilities and rewards. In this paper a proposed VE architecture has been developed for handicraft industry.

Key words: Collaborative Network, Filigree Work, MSMEs, Virtual Enterprise, VE Breeding Environment, VE Broker, Virtual Industry Cluster

I. Introduction

In Indian economy Micro, Small and Medium sized Enterprise (MSME) sector plays significant role in terms of employment creation, regional development, promotion of entrepreneurship culture, individual innovations, development of products for niche markets etc.

MSMEs have certain inherent advantages like

- Lean structure
- Dynamic behaviour
- Quick adaptability to market evolution
- Active involvement of versatile human resources

At the same time activities of MSMEs are constrained due to following conditions

- Limited investment capability in technology, plant & machinery, R&D etc.
- Lack of sophisticated know-how
- Difficulty in diverting skilled personnel from day to day activities to undertake process reengineering initiatives
- Lack of advanced planning support tools specifically developed for them

In turbulent market condition with recession in economy as the platform, it is really testing time for MSMEs to survive and grow. Due to latest manufacturing technology like FMS, CIM, Distributed Manufacturing, Mass Customization techniques large scale organizations are successfully serving the low volume market segments which are catered by MSMEs. Therefore the ability to service niche market, quick to respond towards a business opportunity which are competitive advantages of MSMEs are now under severe pressure to sustain. The below mentioned matrix shows the general strategy for MSMEs to survive and grow by shifting the focus from third quadrant to second quadrant.

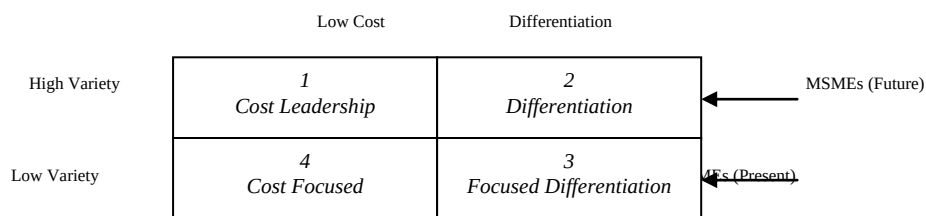


Figure 1: Competitive position for MSME

But in order to operate in differentiation quadrant MSMEs have to invest substantially in technology, R&D, P&M, and aggregate complementary human skills to bring large variety customized products to the market quickly. Since they lack capability to invest in above mentioned sectors, therefore MSMEs have no other choice but to collaborate with each other to compete in the market place. Cooperative networked structures, joint design and production along with marketing processes will strengthen the competitive position of MSMEs by giving them virtual size. This means that network of smaller companies are able to act like larger ones. The idea

of highly dynamic organizations, that form themselves according to the needs and opportunities of the market, as well as remaining operational as long as these opportunities persist, put forward following benefits.

- Agility: the ability to recognise , rapidly react and cope with the unpredictable changes in the environment in order to achieve better responses to opportunities, shorter time to market, and higher quality with less investment.
- Complementary roles: enterprises seek for complementarities (creation of synergies) that allow them to participate in competitive business opportunities and new market.
- Achieving dimensions: MSMEs being in partnerships with others allows them to achieve critical mass and to appear in the market with a larger apparent size.
- Competitiveness: achieving the cost effectiveness, by proper division of sub-tasks among cooperating organizations and timely response by rapidly gathering the necessary competencies and resources.
- Resource optimization: smaller organizations sharing infrastructures, knowledge, and business risks.
- Innovations: being in a network opens the opportunities for the exchange and confrontation of ideas, a basis for innovation.

II. A case study

The millennium city Cuttack of India is famous for filigree works. Around two thousand families are engaged in this profession of making decorative jewellery and artifacts made of fine silver wires. But now-a-days this handicraft industry is facing stiff competition from other closed substitutes. Following factors are ailing this traditional household industry.

- From customer's side
 - i) Filigree products are not easily available throughout the world. These are mostly localized at Cuttack.
 - ii) Not much innovation in design of artifacts. Only certain standardized designs are visible.
 - iii) No provision for customized products available.
- From manufacturer's side
 - i) No use of latest technology. So productivity is low.
 - ii) No control over cost of the raw materials.
 - iii) Large percentage of profit is kept by the retailer.
 - iv) Not much skill up gradation training available.
 - v) Lack of financial and design resources.
 - vi) Less direct contact with the customers.
 - vii) No strong association to impose beneficial decision on government and other agencies.

Taking all above factors into consideration, a Collaborative Network (CN) among all partners of filigree works is proposed which will create competitive advantage through innovation, productivity, quality and flexibility. Since filigree works are produced by micro enterprises consisting of only three or four family members, therefore they lack financial and technical resources. A CN where like minded artisans come together to co-create new products and commercially exploit business opportunities which are impossible to cater individually, can give the image of single entity to the customers. Through the network the partners share resources, risks, responsibilities and rewards. And ultimately win-win situation prevails for all stake holders, i.e. artisans, suppliers, retailers, customers and local people.

A CN can take many possible shape and structure. For this case one potential form is Virtual Enterprise (VE). The definition of VE according to the National Industrial Information Infrastructure Protocols consortium (NIIIP) is a temporary consortium or alliance of companies formed to share costs and skills and to exploit fast changing opportunities. [1]

III. Architecture of VE

It consists of a variety of entities (organizations and people) that are largely autonomous, distributed, and heterogeneous in terms of their operating environment, culture, social capital and goals, but the partners share information, resources and responsibilities to jointly plan, implement and evaluate a program of activities to achieve a common goal. Collaboration involves mutual engagement of participants to solve a problem together, which implies trust and thus takes time, effort and dedication. The various pillars of VE are discussed here. [2]

- Virtual Industry Cluster (VIC): This represents a group of companies, typically located in the same geographical region and operating in a common business sector, developing some sort of bonds among themselves in order to increase their general competitiveness. These bonds may include sharing some buyer-supplier relationships, common technologies and tools, common buyers, distribution channels or

common labour pools, all contributing to some form of collaboration when business opportunities arise. This requires strong information and communication technology (ICT) infrastructure.

- Virtual Enterprise Breeding Environment (VBE): This represents an association of organizations and their related supporting institutions, adhering to a base long term cooperative agreement, and adoption of common operating principles and infrastructures, with the main goal of increasing their preparedness towards rapid configuration of temporary alliances for collaboration. VBE consists of one or more VIC.
- Virtual Enterprise Broker (VEB): This business entity is responsible for searching opportunities in the global environment and enables the creation of VEs.
- Virtual Master Organization (VMO): It performs the process of partner search and partner selection, and configures suitable infrastructures for VE formation/ commitment (physical, legal, social/cultural, information). To achieve its goal the VMO uses the services provided by VICs. Sometimes VLO acts as VEB and vice versa.

IV. Framework for VE in filigree work

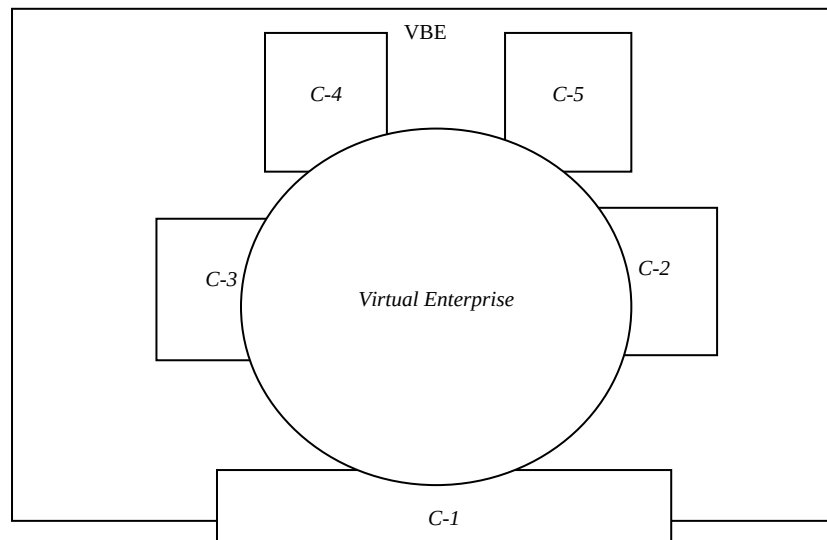


Figure 2: Frame work for VE in Filigree Work

- C-1: Manufacturing Cluster
- C-2: Design Cluster
- C-3: VE Broker Cluster
- C-4: Master Company Cluster
- C-5: Financial Institution Cluster

The various clusters of proposed VE are described here.

- Manufacturing Cluster: This consists of filigree artisans, raw material suppliers, skill up gradation training institutes, local technical colleges & universities, government agencies in charge of handicraft sector, R&D institutions. The following benefits will accrue due to formation of cluster.
 - Improved bargaining power for purchase of raw materials due to bulk purchasing. The local government can provide the required raw materials through various agencies like Orissa Small Industries Corporation (OSIC) at competitive rate.
 - The traditional low productive skill can be up graded easily through training from local institutes.
 - Development of better raw materials, manufacturing process, aesthetic design can happen through collaboration with local technical institutes, universities and r&d institutions.
 - The lending institutions prefer to finance the cluster rather than individual organization.
 - Generally all members of the cluster are integrated through ICT infrastructure. Unfortunately in this case the micro filigree units do not have required ICT facility. Therefore a few units need to be up graded to have required ICT infrastructure so that all information regarding the cluster are available for future action. These units will be called leader cluster organizations.
- Design Cluster (DC): This represents the association of designers (organizations & individuals) of multiple domains. The members may not be geographically concentrated at a single locality. But all are connected through ICT network for faster and better sharing of information, resources, responsibilities,

rewards etc. In this case the designers will give shape to customer's ideas, provide innovative designs regularly. The individual designers (local & global), technical institutes, R & D institutions will join as member of design cluster. A database is to be maintained for sharing of information with others.

- Financial Institution Cluster(FIC): The banks, venture capitalists, angel investors, private equity players, micro finance institutions, chit-fund organizers will form FIC which in turn provides immediate finance to the clusters for speedy execution of projects.
- VE Broker Cluster (VEBC): The members of this cluster always search for new business opportunities. They identify the customers through physical retail shops or websites.
- Master Company Cluster (MCC): The responsibility of coordinating all activities of VE lies with master company. In a distributed manufacturing environment production planning has a key role. The coordination of the orders, optimal assignment of the different resources, independence of nodes (micro organization), stability of the network, availability of right information at the right time, capacity and performance of each node, transports between the nodes and work load distribution policies are key factors to be considered by master company.

In order to achieve the required network timeliness and coordination neutrality, three software modules are required. [3]

- i) Coordination Module: It realizes the network planning policy and is responsible for controlling the connection outside the network, for keeping the contact with the customers, for selecting the proper nodes (production units) and for distributing production tasks to them.
- ii) Local Planning Module: This supports the network related activities in charge of each node, aimed at managing and communicating delivery plans and delivery conditions with the coordination unit and the supplier and client nodes. The local planning modules realize the network controlling tasks of the node, in order to fulfill the goals of management and communication, and deliver the status information of the node to the other nodes.
- iii) Performance Evaluation Module: This module is used by the coordinating unit to calculate node reliability starting from measures of their past behaviours, and network reaction capability by simulating possible scenarios. The performance evaluation module supports the work of the coordinating unit in selecting the best node for fulfilling a task. This node generates different measures, statistics and estimations based on the past behaviour of nodes.

Purchase Execution

- A customer gives his/her ideas about an artifact made of silver wire in the website of VEB.
- The concerned VEB transfers the information to Design Cluster for converting the concept to design.
- The members of DC provide different design forms to VEB.
- The customer selects his/her preferred design.
- The selected design transfers to Master Company database.
- The Master Company searches the database of Manufacturing Cluster for required manufacturing activities, lead time, cost of production etc.
- Then it gives information regarding price of the product. Schedule of delivery to VEB.
- Once the customer approves the price and delivery time of the product, the deal is finalized.

V. Conclusion

VE provides a new approach for competition in the market place. MSMEs seem to be appropriate units to behave like network nodes of VE because of their lean structure, better adaptability, habit of establishing subcontracting relations, independence, and flexibility. In near future we will find many practical implementation of VE in real world.

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