CHAPTER-1
INTRODUCTION

GEMS AND JEWELLERY: MEANING AND NATURE

The word jewellery is derived from the word jewel, which was Anglicized from the old French “jouel” approximately in the 13th century. Jewellery is one of the oldest forms of body adornment. Recently found 1,00,000 years old beads made from nassarius shells are thought to be the oldest known jewellery. The primary function of gems and jewellery is to decorate and adorn. However, demand for different types of jewellery is influenced by various factors including its varieties, properties and buyer’s preferences etc.

Most cultures have at some point of time had a practice of keeping large amounts of wealth stored in form of gems and jewellery. Gems and jewellery have been used as trade goods. Gems and jewellery are being used since ages for both its aesthetic as well as investment purposes.

The gems and jewellery industry is a fascinating industry. It is traditional as well as glamorous. The industry employs millions of people worldwide. It is truly global industry from raw materials processing in Australia, Canada, Africa and Russia to manufacturing in China, Italy, Turkey and retailing in Europe, USA, Middle East and Asia. The global Gems and Jewellery industry is on the path of transformation.

With the evolution of human society, the various activities aligned with the jewellery like mining, polishing, cutting, retailing and fabrication started getting organized. Initially the industry was concentrated around a specific geography. Gradually, over a period of time, it emerged as a global industry. Globally, the industry has played a very important role in the history, culture and tradition of human civilization. Human beings across cultures, geographies and social strata have always been attracted towards the inherent value of gems and jewellery. Sourcing destinations as well local economic conditions in the key markets have been the major forces in play to shape the fortune of the industry.
The history of jewellery is a long one with many different uses among different cultures. The first signs of jewellery come from the people in Africa. Perforated beads made from snail shells have been found dating to 75,000 years ago at Blombos Cave.

Most of the historians believe that richly designed jewellery existed during the Vedic Age. Mrs. Mehta writes in this connection, “The sage Kakshivat, the reputed author of several hymns of the Rig-Veda, prays for a son’ decorated with gold ear-rings and a jeweled necklace”. She also refers to ‘Large-esses to priests and Brahmins’ in the form of jewels. Sraj was supposed to enhance the comeliness of the wearer.

The Rig-Vedic references to jewellery indicate the existence of beautiful jewellery and names are also ascribed to different pieces of jewellery. There must have been names for the jewellery of the proto-historic period too, but they would become known only after the Mohanjodaro script was deciphered. During the Vedic and Puranic periods nishka and rukma were pendant to ornamental chains and necklaces respectively, Karana sobhana was ear jewellery, while opasa mukuta, as it was later called, meant a crown.

It would appear that the decoration of the Deccan had its origin in the Sarj of olden times. It is said that Kadi or Khudwa is a Pseudonym of the word khadi. The jewellery termed Kumba and Kurira were worn exclusively by women. The shell bangles finely carved and inlaid with gold, known as kambu, most probably had their origin in the ancient kumba.

Girdles were very much in fashion in those days and in certain regions the fashion had continued even down to our own time. They were formerly known as nyochani and formed a part of the bridal ornaments. The nirukta part of the Vendangs and the Laws of Manu, all taken together, give a comprehensive picture of Indian jewellery as means of adornment, its place in the life of the people, the country and its economic aspects as well as its importance in the settlement of marriages.

Women wore a fan-shaped head dress. Small cones of gold, silver, copper and faience as also of shell were worn on the sides of head. The
The forehead was decorated with a fillet or a head-band. Ear-ring was made of coils of gold, silver, copper and faience. There was a variety of necklaces having pendants in the middle with a number of rows of various shapes and materials. Finger rings, bangles and bracelets were very common in use.

The gold used in the Indus Valley appears to have been obtained from the gold mines at Kolar and the mines in the Anantpur district. Different kinds of beads of gold were made by soldering cup like pieces together or by casting or by beating out and soldering together. Bangles were made of thin sheets of gold with the metal slightly overlapping on the inside.

Afghanistan, Armenia and Persia rank among the probable sources of silver. Large globular silver beads were cost or beaten out. Ear-rings were made of silver wire roughly bent round; silver bracelets were made on core like gold bracelets. Copper and bronze are found side by side at the lowest level at Mohanjodaro. Copper may have come from Rajasthan, Baluchistan or Tamil Nadu. The use of bronze indicates a great advance over contemporary civilization in metal working. Lead was extensively mined in India; and Ajmer may have supplied lead to the Indus Valley. Shell was extensively used specially in the making of ornaments. Most of the shell might have been obtained from places along the coast of India and the Persian Gulf. Oliva was worn as an ornament and had some magic value attached to it. Cookle shells were probably used, as in early Sumer.

**Rings in Ancient India**

The history of the jewellery industry in India can be traced with the history of the use of the rings, which have ever remained a common ornament in the annals of history. Kusum Mehta, a well known authentic writer, states that rings were worn in India in ancient times. According to her rings were worn as talismana and amulets from the times of the pharaohs. Excavations of famous tombs have yielded examples of ‘poison detecting’ rings still on the fingers of the mummies. It was believed that all the dangers of travel and sudden death were averted by wearing rings adorned with cabalistic signs.
Fingers rings and ring stones were found in practically all levels of the Indus Valley civilization but unfortunately we do not find them on the fingers of the clay. Even an authentic evidence of use of finger rings has been obtained from a skeleton of 1946 series of Harappa, discovered by Wheeler.

One finger ring has been found at Ghazi Shah of Amri Nal Culture. It is made of copper with a diameter of 0.7”. Another copper finger ring of a similar shape was found at Dhal, another site where Amri type of pot-shape was notice. These rings are simple to make as they are made from flattened copper wire joined together by soldering.

A bronze ring of the Indus Valley culture has been found at Noghul Ghundy. It has a hazel at the top and is oval in shape. From atratumvi of Harappa, Vats has found a plain ring of gold rectangular in section. Its diameter is 0.67”. From the same site, one copper ring with three overlapping coils of thin copper wire and the other two small copper rings of flat copper wire have also been found. During the exploration, on the same site Mr. Majumdar found a stone ring from chahhudurao which is of considerable interest. An interesting piece is a finger ring found at Mohanjodaro a trefoil ring.

The outer diameter of the rings is 1.6” and the inner is 0.7”. Several finger rings of shell have also been found at Mohanjodaro simply manufactured and having no designs on them. From the Shahi Tomb, Sir Aural Stein has found a stone ring in one of the graves. It belongs to the Jhangar culture. It can very easily be concluded that in Egypt, the finger rings would have been one of the first pieces of metal jewellery to be manufactured by the early Bronze Age man of India.

Finger rings are used in all parts of the country. Augi (WestBengal), Anghothe (Maharashtra), Angho-uti (Bihar), Munda (Orissa), Biuti (Madhya Pradesh), Waij (Kashmir) and Mundari (Rajasthan) are the common names of finger-rings today.

GEOGRAPHIC SPREAD OF GEMS AND JEWELLERY INDUSTRY

Jewellery making is spread throughout the country with every village having a family of goldsmiths. The diamond processing industry has spread
from the State of Gujarat, which accounts for almost 85 per cent of the diamonds processed in India, to other states. Surat, Bhavnagar and Ahmedabad are the diamond centres in Gujarat. Many diamond processing units have been set up in Mumbai in Maharashtra. There are also diamond processing units in Trichur in Kerala, Coimbatore in Tamil Nadu, Jaipur in Rajasthan and also in Goa. Mumbai continues to be the main trading centre for diamond exports. Almost 93 per cent of diamond exports are dispatched through Mumbai airport.

The jewellery crafting and designing is confined to only a few regions in the country and every region specializes in separate craftsmanship skills. The main clusters in Indian gems and jewellery industry are following:

**Figure – 1.1**

Clusters in Indian Gems and Jewellery Industry

*Source: KPMG Analysis*

- Surat is an important diamond processing centre, which exports around 80 per cent of the production and has more than 3,500 diamond processing units.
• Jaipur is a key centre for polishing precious and semi-precious gemstones.

• Delhi and its neighboring states are famous for manufacturing silver jewellery and articles.

• Calcutta is popular for its lightweight plain gold jewellery.

• Hyderabad is the centre for precious and semi-precious studded jewellery.

• Nellore is a source for handmade jewellery that has been supplying the Chennai market for quite a few decades.

• Coimbatore in Tamil Nadu specializes in casting jewellery.

• Mumbai is the centre for machine made jewellery. The city is also India’s largest wholesale market in terms of volume.

• Trichur in Kerala is another source for lightweight gold and jewellery and diamond cutting.

Each of these clusters have evolved in support of the factors like raw materials, skilled and productive labor force, underlying market potential and government’s cluster development and Special Economic Zones (SEZ) programs. All these clusters have helped India in creating worldwide competitive environment for gems and jewellery industry.

SOCIO-ECONOMIC CONTRIBUTION OF GEMS AND JEWELLERY INDUSTRY

The Indian gems and jewellery industry has proved its mettle in international competitiveness. Simultaneously, it has also made significant socio-economic contribution:

• The investment required for creating employment in the diamond processing and jewellery making units is quite low. On the other hand, employment generation in other industries call for heavy investment.
Due to low power consumption the gems and jewellery manufacturing processes do not aggravate the country’s energy problems.

The countries to which India exports gems and jewellery are among the hard currency areas. The industry contributes continuously to the country’s foreign exchange reserves.

Diamond processing and jewellery manufacture do not pollute the environment, neither air nor water. This industry can be called environmental friendly industry because being an import based industry, it does not deplete natural resources and also leaves the flora and fauna intact.

Through decentralized location, the gems and jewellery industry helps in the removal of unemployment in the rural sector, prevention of migration to cities and the avoidance of slums in the urban areas.

The raw materials as also the finished products of gems and jewellery are of high-value but of low weight. They do not put any burden on the country’s road, rail, sea and air transport.

GEMS AND JEWELLERY INDUSTRY AND INDIAN ECONOMY

The gems and jewellery industry plays a very important role in the Indian economy. The industry in the India comprises of sourcing, processing, manufacturing and selling of precious gemstones and artificial jewellery. India is one of the fastest growing jewellery markets in the world.

Statistics suggest that 60 per cent by value, 82 per cent by volume and 95 per cent of cut and polished diamonds all over the world get processed in India. It is estimated that 11 out of every 12 diamonds are cut in India.

Indian gems and jewellery industry is bright star of the economy and one of the important foundations of the country’s export-led growth. Currently, gems and jewellery industry in general and diamond industry in particular are perhaps the only industry in India, which is almost hundred per cent export
oriented and which has done so well without being in any way a burden on the public exchequer. Gems and jewellery industry has gradually become vitally important for the Indian economy due to its contribution in India’s total exports. It is a leading foreign exchange earner and one of the fastest growing sectors accounting for 16.44 per cent of India’s total merchandise exports during the year 2009-10.

The labour-intensive, cottage gems and jewellery industry being run with modest investment has been providing employment to millions of Indians. In the industry majority of the workforce come from the economically weaker sections of the society. The growth in the gems and jewellery sector and progressive improvement in the value addition chain have been contributing in the nation’s industrial development.

Major segment of the Indian gems and jewellery industry is unorganized and fragmented with most of the players running family owned business. It is estimated that there are nearly 5,00,000 goldsmiths, over 1,00,000 jewellers, over 6,000 diamond processors, and about 8,000 diamond jewellers in the country. (Exim Bank)\(^5\)

**EXPORTS OF GEMS AND JEWELLERY PRODUCTS**

The gems and jewellery products can be classified into eight major groups based on the Gem and Jewellery Export Promotion Council (GJEPC) export data such as following:

1. Cut and Polished Diamonds
2. Gold Jewellery
3. Coloured Gemstones
4. Pearls
5. Non-gold Jewellery
6. Costume/Fashion Jewellery
7. Synthetic Stones
8. Rough Diamonds
1. Cut and polished diamonds consist of crushed industrial diamonds, non-industrial diamonds and others.

2. Gold jewellery comprises jewellery of gold unset, jewellery of gold set with pearls, jewellery of gold set with diamond, jewellery of gold set with precious and semi-precious stones, manufactures of gold and articles clad with gold.

3. Coloured gemstones include rubies, sapphires, emeralds, moon stone cut, gernet cut, agate cut, chloldony cut and topaz aquamarine etc.

4. Pearls constituent of gems and jewellery products consist cultured pearls worked and cultured pearls unworked.

5. Non-gold jewellery includes sub-sectors silver filligree work, silver jewellery set with gems, jewellery of platinum group, manufactures of silver and manufactures of platinum.

6. Costume/fashion jewellery consists of cuff links and studs of base metal, bangles, German silver jewellery and jewellery set with imitation pearls.

7. Synthetic stones constituent of the gems and jewellery products comprise Piezo Electronic Quartz (PEQ) and reconstructed precious and semi-precious stones.

8. Lastly, rough diamonds cover unsorted diamonds worked but not mounted and unworked industrial diamonds.

Besides, there is another major group of gems and jewellery products sold to foreign tourists. Each product of this giant industry represents a unique combination. The skill of artisans honed over generations fuses with the spirit of the new age entrepreneur. Artistry and creativity are given a technical edge with current Computer Aided Design (CAD) applications enabling young designers to conjure up creations that excite the imagination creations in white and yellow gold, platinum and silver plain or studded with diamonds, pearls and coloured stones of every hue.
The overall export performance of gems and jewellery products during the last twenty years from 1990-91 to 2009-10 is displayed in figure-1.2 as per the analysis of Gem and Jewellery Export Promotion Council (GJEPC). Notwithstanding the exports of eight major gems and jewellery products and sales to foreign tourists of gems and jewellery from India increased from Rs. 5360 crores in 1990-91 to Rs. 139056.40 crores in 2009-10. There is also a lot of real potential in international markets for bringing exports to a great level from the country. Additionally, during the first five years exports of gems and jewellery have been continuously increasing but in the years 1995-96 to 1996-97 and 1999-00 to 2001-02 it is almost constant. Further, during the rest of the study period the exports of the gems and jewellery have been continuously ever increasing.

**Figure – 1.2**

**Total Exports of Gems and Jewellery Products from India during the Period 1990-91 to 2009-10**

Source: Gem and Jewellery Export Promotion Council (GJEPC), Ministry of Commerce and Industry, Government of India, New Delhi.
Figure – 1.3
Exports of Cut and Polished Diamonds from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2

Figure – 1.4
Exports of Gold Jewellery from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2
Figure – 1.5
Exports of Coloured Gemstones from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2

Figure – 1.6
Exports of Pearls from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2
Figure – 1.7
Exports of Non-Gold Jewellery from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2

Figure – 1.8
Exports of Synthetic Stones from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2
Figure – 1.9
Exports of Costume/Fashion Jewellery from India during the Period 1990-91 to 2009-10

Source: Ibid., Figure-1.2

Figure – 1.10
Sales to Foreign Tourists of Gems and Jewellery Products from India during the Period 1990-91 to 2009-10

Source: Ibid., Figure-1.2
Figure – 1.11
Exports of Rough Diamonds from India during the Period
1990-91 to 2009-10

Source: Ibid., Figure-1.2

Figure-1.3 reveals India’s year-wise comprehensive exports of cut and polished diamonds to various major global markets during the period from 1990-91 to 2009-10. It is clear from the figure that the exports of cut and polished diamonds from India increased from Rs. 4739 crores in 1990-91 to Rs. 86125.98 crores in 2009-10 and the trend of the exports of gold jewellery increased from Rs. 364 crores in 1990-91 to Rs. 45802.12 crores in 2009-10. Further, the exports of coloured gemstones have tremendously increased during the period 1990-91 to 2009-10. However, the exports trend of non-gold jewellery (Figure-1.7) and the exports of rough diamonds (Figure-1.11) have also been revealing significant increasing trend. On the other hand, exports of pearls (Figure-1.6), exports of synthetic stones (Figure-1.7), exports of costume/fashion jewellery (Figure-1.9) and sales to foreign tourists (Figure 1.10) have been showing the trend of fluctuating nature over the study period.
STATUS OF INDIAN GEMS AND JEWELLERY INDUSTRY IN INTERNATIONAL MARKET

India plays a very significant role in world’s gems and jewellery market, equally as a source and a consumer. The size of the Indian jewellery market is the largest in the world, second only to the US market, followed by China, Japan and Italy. India is known to be the largest consumer and fabricator of gold in the world. Indian designers have made a mark on the world jewellery scene and won recognition for design development as well. The phenomenal growth in gems and jewellery exports is a record among the large Indian exports sectors. In fact, the gems and jewellery industry presents itself as perfect case study for discussing how to build competitiveness of Indian industries. The diamantaires and jewellery markets and their devoted and skilled artisans have shown that even an unorganized sector industry can achieve international competitiveness. The Indian gems and jewellery industry was the first one to absorb and assimilate the true spirit of globalization by integrating itself with the world gems and jewellery industry. But still according to the reports of World Gold Council (WGC), India has tremendous potential, not yet exploited, for gems and jewellery exports. India has, in current, largest artisans for making jewellery in the world. Practically, every village boasts of a family of goldsmiths, having a very long tradition of jewellery making.

Indian hand-made jewellery has a large ethnic demand in several countries sizeable Indian emigrant population such as the Middle-East, South-East Asian countries, USA, Canada and so on. Indian machine-made gems and jewellery products will also generate demand from non-ethnic jewellery markets abroad. Thus the need of the hour is to create fusion of Indian and Western fashion.

SOURCES OF DATA

The present study has made use of secondary data available from various authenticated government sources. Most of the data were collected from:
(i) Foreign Trade Statistics of India, Director General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Commerce, Government of India, Kolkata.

(ii) Annuals reports of Gem and Jewellery Export Promotion Council (GJEPC), Ministry of Commerce and Industry, Government of India, New Delhi.

(iii) Export Import Data Bank, Director General of Commercial Intelligence and Statistics, Ministry of Commerce, Government of India, Kolkata.


(v) Besides these sources, the following are also taken into consideration:

http://www.gjepc.org (GJEPC)

http://www.commerce.nic.in

http://www.dgciskol.org (DGCI & S)

http://www.eximbankindia.com

http://www.indiabudget.nic.in (GOI)

http://www.wto.org (WTO)

http://www.comtrade.un.org

OBJECTIVES OF THE STUDY

The overall objective of the study is aimed at understanding India’s trade of gems and jewellery products in the global market, its problems and future prospects. The specific objectives of the study are as follows:
(i) To assess India’s position in the exports of various types of gems and jewellery products in international market.

(ii) To examine the measurement of stability in the exports of gems and jewellery products at the global level.

(iii) To evaluate the role of government for promoting the exports of gems and jewellery products from India keeping in view the future prospects.

(iv) To identify the specific problems faced by the Indian producers and exporters of gems and jewellery products in the global market.

(v) To explore the possibilities and ways to promote gems and jewellery products from India.

(vi) To make an assessment of the overall performance of the exports of gems and jewellery products from India.

RESEARCH METHODOLOGY

The present research work is primarily an analytical and critical study of figures related to the performance of Indian gems and jewellery sector in the global market for the period 1990-91 to 2009-10. The exports of gems and jewellery products are contributing significantly in the field of Indian exports and play a significant role for the overall economic growth and sustainable development of the Indian economy. To achieve the various objectives of the study various mathematical and statistical tools like, coefficient of variations, compound annual growth rates, trend values, percentage change, regression, tabulation, bar diagrams, line diagrams and a variety of various indices are used in the study.

In addition, the information was gathered from exporters, producers and artisans to identify problems being faced by them in Indian gems and jewellery industry.
Tabular and regression analyses are the main tools used in the present study. The export coefficients (country-wise as well as year-wise and product-wise) for the gems and jewellery products exports to various countries have been taken into consideration.

However, to achieve the specific objectives of the study, some other analytical techniques/methods have also been used. A brief introduction of the analytical techniques used in order:

To measure the country concentration of gems and jewellery products exports from India to 50 major importing countries of the world, six indices have been used. These indices are (I) Index of Maximum Proportion ($D_1$), (II) Hirschman Herfindhal Index ($D_2$), (III) Entropy Index ($D_3$), (IV) Concentration Ratio of CR$_4$ ($D_4$), Concentration Ratio of CR$_8$ ($D_5$) and Concentration Ratio of CR$_{16}$ ($D_6$). In the study, all the six concentration measures are based on the share (export coefficients) of the individual countries importing the gems and jewellery products.

Let $m$ denote the importing countries and $q_{it}$ represents the imports of $i^{th}$ partner country at time $t$. Then the sum of $q_{it}$ from 1 to $m$ will be $q_t$, and the share of each country in the import of gems and jewellery products for year $t$, would be expressed as:

$$S_{it} = \frac{q_{it}}{q_t} \quad \text{and}$$

$$q_t = \sum_{i=1}^{n} q_{it}$$

where

$S_{it}$ : Share of each importing country at time $t$
$q_{it}$ : Imports of each importing country at time $t$
$q_t$ : Sum of the total of each importing country

$i = 1, \ldots, m$ and $t = 1, \ldots, T$

All the concentration measures below are based on $S_{it}$. 
(I) **Index of Maximum Proportion:**

\[ D_1 = \max S_{it} \]

This is a measure of market and products concentration. For increasing diversification, \( D_1 \) is decreasing. That is with increase in diversification maximum proportion held by any country in the total countries decrease. \( D_1 \) takes a value equal to one when there is a complete concentration of gems and jewellery exports in one country out of total countries included in study.

(II) **Hirschman-Herfindhal Index:**

\[ D_2 = \sum_{i=1}^{n} S_{it}^2 \]

where

\[ S_{it} : \text{Share of } i^{th} \text{ importing country at time } t. \]

Herfindhal Index \( (D_2) \) takes the value ranging from 0 to 1 where 0 signifies perfect diversification and 1 refers to perfect specialization. Thus, HHI has an inverse relationship with diversification.

(III) **Entropy Index:**

\[ D_3 = \sum_{i=1}^{n} S_{it} \log \frac{1}{S_{it}} \]

The higher value of the Entropy Index \( (D_3) \) indicates greater information about the concentration of importing countries.

(IV) **Concentration Ratio (CR_n):**

The Concentration Ratio (CR) measures the total share of \( n \) countries, which have the largest share in the imports of gems and jewellery from India. It is denoted by \( CR (n) \) and calculated as:

\[ CR_n = \sum_{i=1}^{n} S_{it}, \ n < m \]

In most cases \( CR_4 (D_4), CR_8 (D_5) \) and \( CR_{16} (D_6) \) have been used in the study. The selection of \( n \) (countries/markets) in the concentration measure is
arbitrary. This is its main disadvantage but is widely used because of its eco-
friendly applications.

To examine the status of Indian gems and jewellery products exports from India to global market and to estimate the trends of the data of exports for the period 1990-91 to 2009-10, the growth rate of fifty major countries included in the study have been calculated. Further, the importing countries have been categorized into the following three categories: Category-I includes countries having greater than 40 per cent growth rates (High Potential); Category-II includes countries having between 10 per cent and 40 per cent growth rates (Middle Potential) and Category-III includes countries having below 10 per cent growth rates (Low Potential). The classification reveals the direction of the trade of gems and jewellery products and market segmentation on the global scale over the study period. The use of the ranks has also been made in identifying the status of a country within a category that again clearly states the comparative analysis of India’s gems and jewellery exports to these countries. The tools used for the calculation are the following:

(I) **Compound Annual Growth Rate (CAGR):**

When the data relating to a variable increase or decrease by a constant percentage per annum, it is said to grow at a compound rate. The grow rate is called compound growth rate. It is also called compound annual growth. Compound growth rate or Compound Annual Growth Rate (CAGR) is computed by using the following formula:

\[ Y = ab^t \]

where

- \( Y \): Gems and Jewellery Exports
- \( a \): intercept
- \( t \): time
- \( b : 1+r \) and \( r \) is Compound Annual Growth Rate.
The logarithmic transformation of this function gives
\[ \log Y = \log a + t \log b \] which is a log linear function

The values of parameters \( a \) and \( b \) in equation are estimated by using Ordinary Least Square (OLS) method.

The compound annual growth rate is computed as:

\[ \text{CAGR (g \%) = } \left[ \text{Antilog (log } b \text{) } - 1 \right] \times 100. \]

\[(II) \quad Y = a + bt \]

where

\( Y \) = Gems and Jewellery Products Exports
\( a \) = intercept
\( t \) = time
\( b \) = Linear trend

In addition, descriptive statistics pertaining to the exports of India’s gems and jewellery products to various countries have also been calculated. In the explanation of year-wise exports of gems and jewellery products, the use of Means and Standard Deviations have been made to ascertain the average rise or fall in the exports and their dispersion from average value respectively. Similarly, Coefficient of variation, which is considered as a relative measure of the inequality in the exports of gems and jewellery products, have also been found. Coefficient of variation is an important relative measure of dispersion. It was developed by Karl Pearson and is widely used in comparing the variability of two or more series. Coefficient of variation is denoted by C. V. and is given by

\[ \text{Coefficient of Variation (C.V.) } = \frac{\sigma}{\overline{x}} \times 100 \]

\[ \sigma = S. D. \text{ Where } \sigma = \sqrt{\frac{\sum (X - \overline{X})^2}{N}} \quad \text{or} \quad \sqrt{\frac{\sum x^2}{N}} \quad \text{and} \]

\[ \overline{X} = \frac{\sum X}{N} \]
Thus, the uses of simple statistical and mathematical tools have been made for the successful completion of the study. A variety of tables comprising the empirical results under different situations have also been prepared. Obviously, such studies are quite significant for the balanced growth of Indian economy and for the formulation of appropriate policies to promote exports of such products in the present era of globalization.

**CHAPTER SCHEME**

The present study “Problems and Prospects of India’s Exports of Gems and Jewellery” has been divided into six chapters, which are outlined below:

Chapter-I is an introductory one, which spells out the history of gems and jewellery sector; sources of data; research methodology and objectives of the study.

Chapter-II provides a review of literature on various aspects of gems and jewellery sector.

Chapter-III elaborates the export performance of India’s gems and jewellery products in the global market.

Chapter-IV analyses India’s gems and jewellery export experience with its trade partners with the help of certain statistical and mathematical tools.

Chapter-V deals with the problems, prospects and policy initiatives of gems and jewellery products exports.

Chapter-VI ‘Conclusions and Policy Implications’ offers a summary of not only the main findings but also suggests some suitable and significant policy measures for promoting gems and jewellery products exports.
NOTES AND REFERENCES


