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# An Economic Analysis of Silk Saree Weaving by Power Loom: A Study in Tumkur District of Karnataka

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**ABSTRACT**

The growth of power looms had begun during the 1960s and year after year there has been a tremendous growth in the number of power looms. As a result, presently there are more than 22.69 lakhs power looms in the country (3rd census, GOI, 2008). And Karnataka is the fifth state with respect to the number of registered power looms (89,900), offering employment to 2, 04,725persons (www.indianstat.com, 2014-15). The study was conducted in Tumkur district of Karnataka with a total sample size of 60 respondents from three different taluks of Tumkur District. The result of the study revealed that there is a variation in man days used in saree production. The man days depended on the type and design of the saree produced in Power loom (Resham Saree: 0.4 MD, LT (Low twist yarn) Saree: 0.30 MD, Cotton Silk saree: 0.40MD) and the weft used for LT type saree was very less when compared to Resham and cotton silk saree. The total cost of production of Resham saree was high (`401.56) compared to LT and Cotton silk sarees (₹ 224.69 and ₹ 395.70). This is because of the differences in design and colour combination of the sarees. The net returns obtained from Resham saree was ₹ 123.44 with the B:C ratio of 1.30, which means that if you invest one rupee in a power loom , Resham silk saree production can be obtained in ₹ 1.30.

**Keywords:** Power loom, weavers, silk saree, LT saree, Reshamsaree, cotton silk saree

The growth of power looms had begun during the 1960s and year after year there has been a tremendous growth in the number of power looms. As a result, presently there are more than 22.69 lakhs power looms in the country. Looking at the speed of increase in the number of power looms, one may conclude the better future and prospects for the power loom industry.

Maharashtra has the highest number of registered power looms (11,06,474) employing 27,66,185 persons followed by Tamil Nadu (38,73,79) employing 96,84,45 persons and the third state with respect to the number of registered power looms is Gujarat (32,33,39) employing 80,83,48 persons, and then comes Madhya Pradesh with 10,48,23 registered power looms, providing employment to 26,20,58 persons. Karnataka is the fifth state with respect to the number of registered power looms (89,900), offering employment to 2, 04,725persons (www.indianstat.com, 2014-15). In Karnataka 30,988 families are engaged in power loom weaving. The power looms of the state provide employment to 1, 27,535 weavers directly. The power loom have been developed extensively in the districts like Tumkur, Bangalore (R), and Bagalkot. There is a moderate development of power looms in the districts like Gadag, Chikkaballapura, and Bangalore. In the remaining districts the power loom activity is found on a very small scale (Census 2010). The power loom industry of Karnataka is the fifth largest in the country in terms of authorized loomage. Silk varieties predominate the product mix that the industry produces; followed by art silk and cotton varieties. Tumkur and Bangalore are specialized in the production of silk sarees, whereas Belgaum has concentrated on pure polyester sarees and Bagalkot district in cotton sarees.

**Objectives**

1. To assess the financial feasibility of investment in power loom sector.
2. To analyze the economics of silk sarees weaving by power looms.

**Methodology**

The study was conducted in Tumkur district of Karnataka. Tumkur district is situated roughly in the southern part of the state and was purposively selected for investigation and it occupies the second place with respect to the number of weavers in the state (Department of Handloom and Textile, Bangalore 2013-14). In the selected district, out of ten taluks three taluks having the largest number of weavers were selected viz., Tiptur, Gubbi, Turvekere. From each Taluk, 20 Power loom weavers were selected randomly for the study. Thus the total sample size selected for the study was 60. The primary data with respect to Socio-economic condition, problems relating to input procurement, marketing problem and health problems was collected from the weavers by personal interview method with the help of pre-tested schedule.

Financial feasibility technique was used to assess the financial analysis of investment in power loom sector. The economics of silk sarees was calculated by the Budgeting Technique and tabular analysis was used to analyze the price spread and the efficiency of different type of power loom sarees.

**Financial feasibility analysis**: A financial feasibility study is an assessment of the financial aspects of projects. If this is the case, for starting and running a business many things including capital investment, expenses, revenues, and investor income and disbursements should be considered.

1. Pay Back Period (PBP)
2. Net Present Value / worth (NPV)
3. Benefit-Cost Ratio (B: C Ratio)
4. Internal Rate of Return (IRR)

**1. Pay Back Period (PBP)**

Payback period represents the length of time required for the stream of cash proceeds produced by the investment to be equal to the original cash outlay *i.e.* the time required for the project to pay for itself. In the present study, payback period was calculated by successively deducting the initial investment from the net returns until the initial investment was fully recovered.

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{Average annual net cash inflow}}$$

According to the payback criterion, the shorter the payback period, the more desirable is the project.

**2. Net Present Value**

The present value represents the discounted value of the net cash inflows to the project. In the present study, a discount factor of per cent (12 %) was used to discount the net cash inflows representing the opportunity cost of the capital. It can be represented by,

$$\text{NPV} = \sum_{i=1}^{n} Yn(1+r)^{-n} - I$$

Where,

$Y_n$ = refers to the net cash inflows in the $n^{th}$ year

r = refers to the discount factor

I = Initial investment

The decision rule associated with the Net Present Value is the project which will be accepted if its value is positive and rejected if its value is negative (if the net present value is zero, it is a matter of difference).

**3. Benefit Cost Ratio**

The Benefit Cost Ratio (BCR) was worked out by using the following formula:

$$\text{B: C ratio} = \frac{\text{Discounted cash inflows}}{\text{Discounted cash outflows}}$$

$$BCR = \frac{\sum_{t=1}^{n} B_t / (1+d)^t}{\sum_{t=1}^{n} C_t / (1+d)^t}$$

Where,

$B_t$ = Benefits in each year

$C_t$ = Costs in each year

d = Discount rate (12 per cent, the rate at which commercial banks lend loan to open/ start small

and medium scale industry in the year 2013-14)

n = Economic life of the Processing unit

It measures the present value of returns per rupee of the invested and it is a relative measure. The decision rule is that, accept the project when BCR is greater than one, reject it when BCR is less than one and if BCR is zero, it is a matter of indifference.

**4. Internal Rate of Return (IRR)**

The rate at which the net present value of the project is equal to zero is the Internal Rate of Return (IRR) to the project. The net cash inflows were discounted to determine the present worth following the interpolation technique. The method of interpolation followed is as below:

$$\begin{pmatrix}\text{Internal rate}\\ \text{of return}\end{pmatrix}\quad\begin{pmatrix}\text{Lower discount}\\ \text{rate}\end{pmatrix}$$

$$=\begin{pmatrix}\text{Difference between}\\ \text{two discount rates}\end{pmatrix}=\begin{pmatrix}\text{Present worth of the cash}\\ \text{flow at the lower discount}\\ \hline \text{Rate Absolute difference}\\ \text{between present worth of}\\ \text{cash flow at two discount}\end{pmatrix}$$

## RESULTS AND DISCUSSION

### Input use pattern in power loom sector for silk saree production

Quantities of various inputs used per silk saree production in power loom (Table 1) showed that there were variabilities in the number of labour required for different types of sarees produced in Power loom.

**Table 1:** Input use pattern in silk saree production by Power looms (per saree)

| Sl. No. | Particular | Unit | Resham Saree | LT Saree | Cotton Silk Saree |
|---|---|---|---|---|---|
| 1 | Warp | Gm | 16 | 16 | 16 |
| 2 | Weft | Gm | 146.39 | 14.66 | 141.66 |
| 3 | Zari | Marc | 1.00 | 1.00 | 1.00 |
| 4 | Electricity | HP | 1.00 | 1.00 | 1.00 |
| 5 | Human labour | Man day | 0.40 | 0.30 | 0.40 |

This difference in labour depends on workmanship, delicacy, design and the colour combination of power loom sarees. In case of resham and cotton silk saree, the labour needed was 0.40 man days, followed by 0.30 man days for LT Saree. The quantities of weft used for resham type saree was 146.39 gm followed by cotton silk saree (141.66gm) and the variation in input used is due to the variation in design and butta in the sarees.

### Mode and sources of procurement raw material for weaving silk sarees

Table 2 depicted that 10 per cent of power loom weavers procured raw materials on cash payment basis as and when needed and the same proportion in the exchange of finished goods. Majority procured raw materials from the local dealers (40.00%) followed 35 per cent each from the master weavers. The tendency of procurement on cash payment when needed and in exchange of the final goods was more popular because of the small scale production by Power loom.

**Table 2:** Mode and sources of procurement raw material for weaving of silk sarees

| Mode | Source | Power loom (n=60) | |
|---|---|---|---|
| | Frequency % | Frequency | % |
| On cash payment | Producers (25.00) | 6 | 10.00 |
| In exchange of finished goods | Local dealers (40.00) | 30 | 50.00 |
| On partial payment | Master weavers (35.00) | 24 | 40.00 |

### Cost and returns structures from silk saree production in Power loom

The cost of raw materials utilized/saree production in Power loom is presented in Table 3. The cost of raw materials used was high in case of Power loom products. Among all the major inputs, cost incurred on weft and human labour was found to be high. The production cost of resham type sarees was ₹ 401.56/unit followed by cotton silk type at ₹ 395.70. Among the different types of Powerloom sarees, the total cost of production of resham sarees was found to be the highest when compared to the others sarees owing to differences in design and colour combination. This was attributed to increased labour and weft costs.

**Table 3:** Cost of production of silk Sareesproduced in Power loom

| Sl. No. | Particular | Power loom (₹/saree) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Resham Saree | | LT Saree | | Cotton Silk Saree | |
| | | Cost | % | Cost | % | Cost | % |
| I. | **Variable cost** | | | | | | |
| 1 | Warp | 10.66 | 2.65 | 6.12 | 2.72 | 6.36 | 1.60 |
| 2 | Weft | 146.39 | 36.45 | 58.45 | 26.01 | 168.61 | 42.61 |
| 3 | zari | 42.25 | 10.52 | 31.83 | 14.16 | 42.33 | 10.69 |
| 4 | Human labour | 167.18 | 41.63 | 112.85 | 50.22 | 146..00 | 36.89 |
| 5 | Power charge | 0.45 | 0.11 | 0.41 | 0.18 | 0.43 | 0.10 |
| 6 | Other materials | 7.6 | 1.89 | 3.61 | 1.60 | 4.26 | 1.07 |
| 7 | Interest on working capital at 11% | 23.06 | 5.74 | 7.82 | 3.48 | 23.90 | 6.03 |
| | **Subtotal I** | **397.59** | **99.01** | **221.09** | **98.39** | **391.89** | **99.03** |
| II | **Fixed cost** | | | | | | |
| 1 | Rent value of Building | 0.27 | 0.06 | 0.23 | 0.10 | 0.26 | 0.06 |
| 2 | Depreciation | 0.20 | 0.04 | 0.18 | 0.08 | 0.19 | 0.04 |
| 3 | Power connection | 0.14 | 0.03 | 0.13 | 0.05 | 0.14 | 0.03 |
| 4 | Interest on fixed capital at 11% | 3.36 | 0.83 | 3.06 | 1.36 | 3.22 | 0.81 |
| | **Subtotal II** | **3.97** | **0.98** | **3.60** | **1.60** | **3.81** | **0.96** |
| | Total cost (I + II) | 401.56 | 100 | 224.69 | 100 | 395.70 | 100 |

*Other materials include transportation charge, gum, Greece etc.*

The average selling price and net return for different type of sarees produced in Power loom were presented in Table 4.

**Table 4:** Returns from Power loom silk Sarees produced

| Particular | Power loom | | |
|---|---|---|---|
| | Resham Saree | LT Saree | Cotton silk Saree |
| Selling price (₹) | 525.00 | 280.00 | 510.00 |
| Cost of production (₹) | 401.56 | 224.69 | 395.70 |
| Net return (₹) | 123.44 | 55.31 | 114.30 |
| B:C ratio | 1.30 | 1.24 | 1.28 |

Among all the different type of sarees produced in Power loom, resham saree type fetched the highest market price of ₹ 525/saree followed by LT Type (₹ 280/unit) and cotton silk type (₹ 510/ unit). The difference in price was mainly because of weft and design used in resham saree. Similar results were observed by Sannapapamma, 2000. The corresponding net returns obtained from Resham type saree were also high at ₹ 123.44/unit with B: C ratio of 1.30 followed by ₹ 114.30/unit for cotton silk type saree with B:C ratio of 1.28 and ` 55.31/unit for LT saree was with B:C ratio of 1.24.

## Financial feasibility of weaving enterprise

The total investment cost per Power loom unit varied with the type of power loom established. Highest investment cost was incurred in case of Computer Jacquard type (₹ 5, 67,123/unit) followed by Chain Jacquard (₹ 4, 68,563/unit), 4-Box type (₹ 4, 54,251/unit) and 2-Box type (₹ 4, 27,603/unit). The comparison of the establishment cost between handloom and power loom units revealed that the investment cost required in the case of power loom was 2-3 times more than that for handloom unit. Among the power looms, Computer Jacquard type power loom unit required more cost because it is a computerized machine and can be used as a multipurpose unit that accommodate not only more designs but can also store in computer. Such designs could be used when necessary.

Table 5 presents the financial feasibility analysis of investment in power loom units. This analysis was carried out using analytical techniques namely, Net Present Value, Benefit Cost Ratio, Internal Rate of Return and Payback Period.

## Net present value

The Net Present Value of all the cash flows during the life period of Power loom units, in case of 4-Box

type was found to be ₹ 441702, for 2-Box type it was ₹ 8,33,157, for Computer Jacquard type it was ₹ 1,57,092 and for Chain Jacquard type it was ₹ 14,86,937. The NPV increased over the life period of the project. The NPV being an absolute measure was found to be positive in power loom units and proved investment worth in weaving.

**Table 5:** Financial feasibility of investment in Power loom

| Sl No. | Particular | Power loom | | | |
|---|---|---|---|---|---|
| | | 4-Box | 2-Box | Computer jacquard | Chain Jacquard |
| 1. | Net present value (lakh rupees) | 4.41 | 8.33 | 1.57 | 14.86 |
| 2. | Benefit cost ratio | 1.38 | 1.78 | 1.37 | 1.25 |
| 3. | Internal rate of return (%) | 22.7 | 27.44 | 15.75 | 14.10 |
| 4. | Payback period (years) | 4.18 | 2.26 | 6.45 | 8.05 |

### Benefit cost ratio

The Benefit Cost ratio was worked out for the discounted returns and costs. It was 1.38 for 4-Box type power loom unit, 1.78 for 2-Box type power loom unit, 1.37 for Computer Jacquard unit, 1.25 for Chain Jacquard power loom unit. This implied that for every one rupee invested in Power loom unit, there would be more than one rupee returns realized over the life period of the projects. Thus, proved profitable to invest in weaving.

### Internal rate of return

The internal rate of return indicates the rate of return that accrues to the investment in any project. The formal selection criterion with IRR is that it should exceed the opportunity cost of capital for the project to be accepted. The internal rate of return realized for power looms in case of 2-Box type design was high (27.40%) when compared with the other types like 4-Box (22.70%), followed by Computer Jacquard (15.75%) and the lowest in case of Chain Jacquard (14.10%) type. The magnitude of the ratio also indicated the priority to be assigned for investment in different power loom units. However, the ratios worked out were greater than the opportunity cost of capital for power looms and proved worthy of investment in weaving activity. Thus, irrespective of the type of power looms, it was financially sound and economically viable to invest.

### Payback period

The payback period refers to the time required to recover the initial investment from project cash flows generated from the handloom unit. The results pertaining to the payback period were in line with the estimated values of NPV, B-C ratio and IRR. While, the payback period was 4.18 years for 4-Box type looms, and lowest at 2.26 years for 2-Box type looms, 6.45 years for Computer Jacquard type looms and finally 8.05 years for Chain Jacquard type power loom unit. The pay period was more in case of Chain Jacquard type loom due to high initial investment.

Thus, all the criteria of financial feasibility of the project indicated that irrespective of the type of loom units, the investment in power loom weaving units was economically feasible and financially sound in Tumkur district of Karnataka.

The general inference of the findings was that, investment in power loom units was economically more profitable than that in handloom units. This was obvious and true due to the adoption of advanced technology and the economies of scale in the processing.

## CONCLUSION

Even though the growth of the Power loom industry is increasing over a period of time, it is facing several problems viz., non-availability of adequate quantity and quality of raw material, shortage of working capital, non-availability of marketing facilities, poor credit needs to handloom weavers in the co-operative field, low capacity utilization due to non- utilization of new technology, failure of co-operative movement, stiff competition from organized mill and other sectors, and health problems like headache, leg pain etc. So, there is a need for the government support to uplift the socio-economic condition of the power loom weavers.

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