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Productivity Analysis of Silk Filatures in J&K: A Case Study

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Abstract:
Jammu and Kashmir Industries Limited (JKI Ltd.) is a premier manufacturing Public Sector enterprise in J&K which amongst its various manufacturing activity Groups has two Filatures, one each in Jammu and Kashmir Regions, in which cocoons are processed into silk yarn. The productivity of these Filatures has been dwindling over a period resulting into the huge financial loses for the Enterprise. Thus to conduct an empirical study was need of the hour in which the perceptions of the two main Groups of employees i.e. Managers and Workers were ascertained to analyse various factors responsible for the poor resource-use efficiency in the two Filatures operated by JKI Ltd. This analysis has taken into account inputs as well as outputs of the production system of Filatures for which three main input resources were identified viz; Raw materials, Manpower and Capital. Out of the identified factors pertaining to Raw materials, it has been found that 'Govt. regulations & Purchasing policy', 'non-availability of raw materials', and 'poor quality of raw materials' are most crucial factors leading to its poor productivity. Likewise 'Excessive manpower (overstaffing)' has been found as a common irritant faced by JKI Ltd in both of its Filatures. Plant and machinery used in Filatures is age-old and obsolete because of which the Capital-use efficiency in Filatures has suffered. The Study has been concluded with a host of suggestions to improve the resource-use efficiency of the identified resources with empirical evidence based on the perceptions of the Managers and Workers who are engaged in the Filatures of JKI Ltd.
Key Words: *Resource-use efficiency; Filatures; empirical evidence; interplay of factors.*

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I. Introduction:

Kashmir had a glorious past in Silk Industry and it has been once the main revenue earning industry in J&K. Kashmir silk was known for its beauty, texture and blend and was thus famous throughout the world. However with the passage of time, the silk production in Jammu & Kashmir declined primarily due to the shrinking of cocoon production from one million Kgs in 1947 to 6.66 lac Kgs in 1995-96 and then perpetual reduction in cocoon production onwards. This has resulted in a declining fortune for the Silk Industry in J&K in the form of reduced productivity of its resources. However productivity of an industry is not a function of its inputs and outputs only, but it also represents interplay of multi-faceted factors like managerial efficiency, workers' commitment, quality of raw materials, technology, etc. All this necessitates that any Study on productivity analysis should take into account all those factors that directly or indirectly influence the efficient use of resources in the industry. In the present Study an attempt has been made to measure the efficiency of three inputs (resources) i.e. Raw materials, Manpower and Capital (plant and machinery) as perceived by the Managers and Workers of the two major Silk Filatures in J&K, namely Kashmir Filatures and Jammu Filatures which are the two main Units owned and operated by JKI Ltd (Jammu and Kashmir Industries Limited). Normally any productivity analysis is only done on the basis of input-output analysis which however does not explain the cause of a high score nor does it suggest the potential remedies for poor performance. Keeping this in view, the present Study provides an analysis of those factors which are perceived to have caused changes in the degrees of productivity scores in Silk Filatures of JKI Ltd.

II. Methodology:

A general observation regarding the dwindling profitability of Silk Filatures in JKI Ltd is that the resources which go into the processing of cocoons into Silk thread are not efficiently used in JKI Ltd as a result of which its annual product costs have invariably exceeded the associated product values leading to the huge annual financial losses incurred by this enterprise during the past period. As such lack of resource-use efficiency in JKI Ltd has posed problem of serious concern to the management of this enterprise, since resource-use efficiencies have been significantly hampering its profitability. In order, therefore, to bring to the surface those

factors which have led to the inefficient use of resources in JKI Ltd in Silk Filatures and establish their significance statistically, a field survey was conducted in which well-structured questionnaires were administered among the two selected groups of respondents i.e. Managers and Workers with an equitably distributed sample from each Filatures. For this purpose sixteen factors were identified and combined into three resource-wise categories for the resources of Raw Materials, Manpower and Capital. Through the set questionnaires the respondents were required to indicate their perception with regard to the significance of the identified factors causing inefficient use of resources on a five point '**Likert-type'** scale. Subsequently an inter-Group comparison was made on the basis of perceptual conjunctivity of the two Groups of respondents and relative significance of the causative factors of the inefficient use of the resources with the help of certain statistical techniques which consisted of absolute numbers and mean scores. The 'T' test was applied to find out the level of significance of the difference in mean scores of the perceptions of Managers and Workers with regard to the contribution of individual factors to the inefficient use of resources in Silk Filatures by JKI Ltd. In addition to this, certain such factors were also covered which are not, of course, directly related to the productive use of resources at the constituent unit levels of JKI Ltd, but do form a part of managerial framework which exercise crucial influence on the resource-use efficiency of JKI Ltd at its constituent Activity Group Levels. These five factors were grouped as 'Other Managerial Factors' and a structured questionnaire pertaining to these factors was administered to the ten top Management Personnel of JKI Ltd at its Head Office and Regional Office. Their responses were sought on a similar 5-point Likert type scale and the average scores of individual factors were assigned ranks to arrive at their relative significance in affecting resource-use efficiency. Besides, an objective appraisal of the factors was made on the basis of discussions with the concerned employees at the Units surveyed and the perusal of official records/documents thereof.

Factors causing inefficient use of Resources in Silk Filatures Group:

Silk Filatures in JKI Ltd (consisting of its two units i.e. Kashmir Filatures and Jammu Filatures) has been continuously incurring huge annual losses over the period ranging from Rs. 229.17 lacs in 1988-89 to Rs. 555.73 lacs in 1997-98 (Official Records). With minor oscillations in some years, these losses have been increasing year after year which is a clear indication of the lack of resource-use efficiency suffered by Silk Filatures. However the factors which are perceived to have caused the inefficient use of the identified resources, i.e. Raw Materials, Manpower and Capital are analysed as follows:

I) Inefficient use of Raw Materials in Silk (Filatures) Group:

The raw material of JKI Silk Filatures situated at Jammu and Srinagar is Cocoons, which are reared in many rural areas of Jammu province and Kashmir province as well. Though J&K, with its temperate climatic conditions, is the only erstwhile state in India (now a Union Territory) suitable for rearing of uni-voltine/Bi-voltine silkworm species, yet this industry has suffered over the period for the inadequate availability of quality cocoons. However in order to assess the impact of the identified factors on the Raw Material use efficiency in Silk (Filatures) Group as perceived by Manages and Workers severally, their views were obtained on a 5 point scale and the results are presented in Table (1). The perusal of this Table reveals that the mean differences between managers and workers on the entire factors are not statistically significant meaning thereby that their perceptions with regard to the contribution of these factors to the inefficient use of raw materials coincide with each other and no clash of opinion exists. However an important revelation from the Table is that

Table (1)
FACTORS CAUSING INEFFICIENT USEOF RAW MATERIALS IN SILK(FILATURES) GROUP

S.No	Factors	Managers (N=12)		Workers (N=55)		Mean difference	Values	
		XM	S.D	XW	S.D	XM-XW	't'	'p'
1	Non-availability of Raw Materials	4.50	0.65	4.49	0.63	0.01	0.05	N.S.
2	Poor Quality of Raw Materials	4.25	0.72	3.91	1.27	0.34	1.31	N.S.
3	Mishandling of Raw Materials	2.33	1.03	2.02	0.98	0.31	0.94	N.S.
4	Insufficient Storage facilities	2.00	0.91	1.75	0.77	0.25	0.89	N.S.
5	Govt. Regulations and Purchasing Policy	4.67	0.62	4.58	0.50	0.09	0.53	N.S.
1-5	Average across all Factors	3.55	0.79	3.35	0.83	0.20	0.83	N.S.

Notes:

1. Scoring Scale: Not at all=1, To a very little extent=2, To some extent=3, To considerable extent=4, To a great extent=5

2. When workers score is more than that of managers, (-) sign is used and vice versa.
3. N.S = Not Significant

the mean scores Obtained for various factors from Managers as well as Workers are different from each other. However the ranking of factors on the basis of these mean scores has followed the same pattern in both the cases of managers as well as workers. The highest mean score has been obtained from both managers and workers (Managers: 4.67, Workers: 4.58) on 'Government Regulations and Purchase Policy' which is therefore perceived to be the most important factor causing the insufficient use of raw materials in Silk Group. The other factors in order of mean scores are 'non-availability of raw materials', poor quality of raw materials, mishandling of raw materials and insufficient storage facilities'.

Government regulations and purchasing policy has been rightly perceived to be the primary cause of inefficient use of raw materials in Silk Filatures of JKI LTD. The cocoons are generally procured in open auction from the markets organised by Sericulture Development Department of J&K and the annual procurements are determined by the instructions received from the Government from time to time. Silk Filatures in JKI Ltd are being asked to procure sometimes only A Grade cocoons, sometimes A and B Grade cocoons, sometimes A, B and C Grade cocoons and even some times A, B, C and D Grade cocoons. Moreover instructions are being issued from time to time for transfer of rejected cocoons lying in the godowns of Sericulture Department to Filatures when there is no buyer. Not only this, the procurement rates per kg of cocoons are also fixed by the Government regardless of the prevailing market prices. Moreover, lack of adequate financial resources has usually obstructed JKI Ltd in procuring quality cocoons from the market and in lieu of the subsidy granted by the State Government, cocoons are procured not by choice but by compulsions through the dictates of the Government. As such JKI Ltd has not any clear-cut and independent purchasing policy and everything about the procurement of cocoons is left to be dictated and determined by the State Government. Free Government interference in the purchasing and procurement of raw materials proved to be the first stumbling block in its efficient use.

Non-availability of Raw materials (cocoons) has been rated as the biggest factor responsible for the inefficient use of resources (raw materials). It also leads to the non-utilization of the installed capacities and idle manpower which could have otherwise been put to productive use had the raw materials been available in adequate quantities. The production of cocoons has been continuously declined from1947 figures of one million kgs to 3.39 lakh kgs in 1987-88 which has led to the non-availability of required quantities of raw material (cocoons) to JKI Filatures (Corporate Plan 1989-95). Perusal of Table (2) reveals that for the last ten years since 1988-89, Silk Filatures in JKI Ltd have never procured the cent per cent of its required cocoons except in 1988-89 when the procurement was very near to the requirement. The lowest of procurement has been recorded in 1990-91 when actually no procurement of cocoons is reported to have been made by Jammu Filatures. On the average, the procurement of cocoons for the last ten years in Silk Filatures has remained only to the extent of 55.04% of the actual requirement. Therefore the finding of this Table substantiats the view point of managers and workers who have rated the non-availability of raw materials as the second largest factor responsible for the inefficient use of raw materials in Silk Filatures of JKI Ltd.

As indicated by the mean scores of managers and workers in Table (1), poor quality of raw materials has also been perceived to be a largely responsible factor for inefficient use of raw materials in Silk Filatures. Quality of cocoons affects the renditta (quantity of cocoons required to produce 1 kg of silk) as the variations in later are inversely proportional to the

Table (2)
PROCUREMENT OF COCOONS IN SILK (FILATURES) GROUP

Year	Cocoons Procured		Total Procurement	Total Requirement*1	(4) %age to (5)
	Kashmir Filatures	Jammu Filatures			
(1)	(2)	(3)	(4)	(5)	(6)
1988-89	*4.48*	*0.85*	*5.33*	*5.36*	*99.44*
1989-90	*3.95*	*0.73*	*4.68*	*5.36*	*87.31*
1990-91	*0.79*	*0.00*	*0.79*	*5.36*	*14.74*
1991-92	*3.37*	*0.66*	*4.03*	*5.36*	*75.19*
1992-93	*2.03*	*0.78*	*2.81*	*5.36*	*52.43*
1993-94	*3.10*	*1.43*	*4.53*	*5.36*	*84.51*
1994-95	*1.52*	*0.34*	*1.86*	*5.36*	*34.70*
1995-96	*0.95*	*0.40*	*1.35*	*5.36*	*25.19*
1996-97	*1.50*	*0.50*	*2.00*	*5.36*	*37.31*
1997-98	*1.59*	*0.43*	*2.12*	*5.36*	*39.55*
Average	**2.33**	0.62	2.95	5.36	55.04

***1 : Based on the average number of 429 operational Basins in Silk (Filatures) Group (Kashmir Filatures: 329, Jammu Filatures: 100) with the average production capacity of 169 kgs of silk per basin per year requiring 7.40 kgs of cocoons per kg.of silk.**
Source: Official Records of the Units of JKI Ltd.

former for, better quality of cocoons reduces the renditta. The impact of poor quality of cocoons on the renditta becomes clear from the fact that during the last ten years, the average renditta achieved in silk Filatures for A Grade cocoons was recorded as 5.18 whereas the same has remained as high as16.99 for C Grade (Green) cocoons. Since more than 50 per cent of the cocoons procured by Silk (Filatures) Group are usually of B, C and D Grade, it significantly reduces the production yield of raw materials which could have otherwise been of high yield if the cocoons used were of A Grade quality.

The other two factors of '**mishandling of raw materials and insufficient storage facilities'** have not been viewed as strong factors leading to the inefficient use of raw materials in Silk Filatures by both the groups of respondents whose mean scores do not vary from each other significantly (Table 1). The handling of cocoons starts right at the auction market wherefrom cocoons are procured, packed in gunny bags and then brought to the factories. A transit shortage of 2.5 per cent approved by the Board of Directors was being allowed for a long time which has now discontinued. The cocoons brought to the factories are stored in unsorted cocoon godown in their respective categories of A, B, C and D after which these are subjected to sorting into No. I, II and III Grade categories and the double cocoons besides different wastes such as fluff, P.C, and melted. There is also some percentage of sorting wastage allowed which has become all the more necessary in the wake of unhygienic conditions of the godowns. No doubt with the improvement of these hygienic conditions, the wastage, otherwise permissible, could be reduced to a considerable extent which, would therefore, enhance the efficient use of raw materials.

On the whole across all factors identified for the inefficient use of raw materials in Silk Filatures, the difference in the average mean scores of the managers and workers is not significant as both the Groups of respondents possess almost similar perceptions (Table:1).

II) **Inefficient use of Manpower in Silk Filatures**:

Silk Filatures in JKI Ltd employs about 850 persons working across various cadres like Managers/Officers, Supervisors, Technicians, Clerks and Skilled/Unskilled workers. A large chunk of money is being spent annually on the wage and salary bill of this gigantic manpower, which is not still being efficiently utilized for the profitable operations of the Silk Filatures having accumulated huge financial losses over the period. The inefficient use of manpower represents a big resource loss suffered by JKI Ltd in Silk Filatures Group and, as such, deserves a thorough probe into the factors which have led to this state of affairs. Table (3) enlists the factors which generally lead to the inefficient use of manpower resource in any industrial setting and perusal of the Table reveals that the average mean scores of Managers and Workers varies across all the factors from each other and the difference is statistically significant (P<.05). This implies that on the whole, opinions of Managers and Workers regarding the relative significance of these factors responsible for the inefficient use of manpower varies considerably.

Managers have viewed the **Excessive Manpower (Overstaffing)** as the most responsible factor for the inefficient use of Manpower in Silk Filatures as is indicated by the highest mean score obtained from them. However the mean score obtained for this factor from the workers is lesser than that of the managers and the difference is statistically significant (P<.01). Worker generally have the tendency of not accepting the overstaffing as the main irritant faced by JKI Ltd for their threat perception to be laid off. But the fact of the matter is that overstaffing has eaten the economic vitals of Silk Filatures in the form of huge financial outlays on salary and wage bill of the surplus staff. Idle wages and salaries

Table: (3)
FACTORS CAUSING INEFFICIENT USE OF MANPOWER IN SILK (FILATURES) GROUP

S.No	Factors	Managers (N=12)		Workers (N=55)		Mean differences	Values	
		XM	S.D	XW	S.D	XM-XW	't'	'p'
1	Excessive Manpower (overstaffing)	4.50	0.65	3.22	1.26	1.28	4.92	<.01
2	Non-availability of Technical staff	1.83	0.80	1.44	0.81	0.39	1.63	N.S
3	Absenteeism	3.75	1.23	1.56	0.95	2.19	5.62	<.01
4	Insufficient Working Hours	3.92	1.26	3.42	1.20	0.50	1.25	N.S
5	Lack of Employee Welfare Facilities	1.92	0.95	3.71	1.09	-1.79	3.33	<.01

6	Lack of Training & Development	3.08	1.32	1.75	1.18	1.33	3.24	<.01
7	Lack of Motivation	3.83	1.14	3.44	1.15	0.39	1.08	N.S
1-7	Average across all Factors	3.26	1.05	2.65	1.09	0.61	1.85	<.05

Notes:

1) Scoring Scale: Not at all=1, Toa very little extent=2, To some extent=3, To considerable extent=4,To a great extent=5.

2) When Workers' score is more than that of Managers', (-) sign is used and vice versa.

3) N.S= Not significant.

unequivocally shoots up the cost price of the finished product to render it uncompetitive in the market. As per the official estimates, Kashmir Filatures has 122 surplus markets out of the total number of 497, besides surplus staff in supervisory and administrative cadres. In case the Filatures are modernized and equipped with the latest and more efficient machinery, the overstaffing magnitude will enlarge leaving more employees redundant.

Non-availability of technical staff has been perceived as the least responsible factor for inefficient use of manpower and the difference in the mean scores of managers and workers is not statistically significant. In the wake of surplus staff, there is no dearth of the technical workers and the workers have generally gained technical proficiency from their wide and varied experiences.

Mean scores of managers and workers obtained as 'Absenteeism' as a factor responsible for inefficient use of manpower vary from each other and the difference is statistically significant (P<.01), which means that the two groups of respondents do not share the same opinion about the factor. However the difference in the mean scores of Managers and Workers in case of 'insufficient working hours' and 'lack of motivation' is statistically not significant meaning thereby that there is the similarity of opinions between managers and workers on these two factors being perceived as responsible for the inefficient use of manpower. Especially due to turmoil in Kashmir, working hours available to Kashmir Filatures were considerably reduced and the operations were seldom carried out on a two shift basis with eight working hours for each shift. It was observed by the Author that invariably all employees in Silk (Filatures) Group across, managerial and non-managerial levels have lost motivation towards work and a general feeling of disgust has crept in. Lack of financial incentives (even non-payment of salary and wage dues in time) besides poor and unhygienic working conditions, no promotions and poor profitability conditions of Silk Filatures have been found to be the obvious reasons for lack of motivation and morale in the employees.

It can also be seen in the Table (3) that there exists a divergence of opinion between managers and workers with regard to the significance of 'Lack of employee welfare facilities' and 'lack of training and development 'as causative factors for the inefficient use of manpower. Welfare facilities are usually of great concern for the workers whereas training and development remains a domain of managers. It was found that in Silk Filatures, none of the forms of employee welfare facilities like housing facilities, recreational facilities, free medical aid, canteen facilities and other working environment factors existed which would improve the quality of work life. Lack of these facilities has lowered down the morale of workers which ultimately comes in the way of their productive performance. Similarly lack of training and development has hampered the acumen of managers who generally were found bogged down in performing routines. Though some managers were found to have attended some short term refresher courses long back in the past within and outside J&K, yet such arrangements have been very occasionally made without any consistency and continuity.

III) Inefficient use of Capital (Plant and Machinery)in Silk Filatures:

The falling grace of Silk Filatures has mainly been the outcome of worn-out conditions of its plant and machinery which is more than half a century old. As it can be seen in the Table (4) that no divergence of opinion exists between managers and workers on any of the factors identified as responsible for the inefficient use of plant and machinery as the difference in their respective mean scores is not statistically significant. And also the mean scores for each of these factors obtained from both the groups of respondents is considerably high indicating their significance in causing inefficient use of Capital (plant and machinery)in Silk Filatures. On an average across all the factors, the mean scores obtained from managers and workers are as high as 4.27 and 4.30 respectively (out of the total maximum average score of 5.0) and the difference in these mean scores is not statistically significant which implies that managers as well as workers have no difference of opinion with regard to the adverse impact of the identified factors on the efficient use of capital).

Table (4)
FACTORS CAUSING INEFFICIENT USE OF CAPITAL IN SILK FILATURES:

S.NO	Factors	Managers (N=12)		Workers (N=55)		Mean difference	Values	
		XM	S.D	XW	S.D	XM-XW	't'	'p'
1	Obsolete plant & machinery	4.67	0.47	4.47	1.02	0.20	1.00	N.S
2	Poor working efficiency of plant & machinery	4.42	-0.75	4.40	1.05	0.02	0.08	N.S
3	Non-availability of power	4.17	0.98	4.27	1.10	-0.10	0.31	N.S
4	Poor Capacity Utilization	3.83	1.28	4.05	1.21	-0.22	0.54	N.S
1-4	Average across all factors	4.27	0.87	4.30	1.10	-0.03	0.11	N.S

Notes:
1) Scoring Scale: Not at all=1, Toa very little extent=2, To some extent=3, To considerable extent=4,To a great extent=5.
2) When Workers' score is more than that of Managers', (-) sign is used and vice versa.
3) N.S= Not significant.

Filatures in JKI Ltd are known for their age-old and obsolete plant and machinery which has been in operation for the last more than eight decades and is hardly working at 10-15 per cent efficiency. The repairs are expensive and most of the spares are not available as no such machinery is in operation in the country. Its working results are very poor as it not only affects the quality of the silk yarn, but the turnover as well. For instance there are six boilers installed in Kashmir Filatures out of which only two are in operation for which fuel costs incurred are very exorbitant as the present working efficiency of these boilers is less than 10 per cent. Again out of the total of 744 basins installed in the two Filatures at their inception, only 210 basins are in operation at present and the remaining are completely or partially worn-out. As a result, these two Filatures do not utilize their full installed capacities and that the percentage rate of capacity utilization in the two Filatures has not gone beyond 84 per cent during the last twelve years since 1986-87. Moreover the uninterrupted power supply is not available to the Filatures which has also been hampering their smooth operations. No doubt in order to offset the effect of frequent power breakdowns, Jammu Filatures has an old 25 KVA, 3 YWA Ruston D.G. Set which being very old often breaks down and as such creates more problem than solving. Complete overhauling or repairing of this D.G. Set is difficult because of the fact that this 25 KVA Ruston D. G. Set is very old and its vital spare parts are not available in the market. Even if a huge amount is spent on repairs and overhauling of this set, trouble free service cannot be guaranteed. On the whole the Filatures in JKI Ltd. have an age old technology whereas there has been much improvement in Silk Reeling Technologies in developed countries like China and Japan. With the result, the yarn produced on these age-old machines does not compete in quality and yield percentage with the yarn being produced on modern machines and with latest technology.

III. Conclusion & Suggestions:

After conducting the empirical study it was found that the selectivity of perceptions existed between Managers and Workers with regard to the causes responsible for the poor productivity of resources in Silk Filatures of JKI Ltd. Managers generally have the tendency of escaping from the responsibility of failures, whereas workers squarely put blame on the Management. However both the Groups also share the same perception with regard to the significance of the identified factors leading to the inefficient use of Raw Materials, Manpower and Capital (Plant & Machinery) in the production processes of Silk Filatures in JKI Ltd. However in order to plug the loopholes and overcome the deficiencies as highlighted by the Study, the following measures are suggested:

1. J&K Filatures face acute shortage of quality cocoons because of its falling production which therefore needs to be improved both in terms of quality as well as quantity.

2. Plant and Machinery of the Filatures is very old and almost obsolete, not even sustaining repairs. Amidst the advancement in reeling technology, there is an emergent requirement of modernizing both the Filatures so that the market challenges are effectively met with quality yarns and losses are therefore reduced.

3. In the wake of a small seasonal period for the procurement of cocoons, scientific and modern storage facilities need to be developed in the Silk Filatures so that the wastage and spoilage of materials due to insufficient and unscientific existing stores could be reduced.

4. In the rationalisation of manpower, surplus labour needs to be disposed of so that wage rate per kg of silk is brought at par with other parts of the country like Karnataka state.

5. In order to compete with Chinese and Korean silk yarn, cost of production of silk yarn by J&K Filatures needs to be restricted to the permissible limits with the use of modern technology and rigorous marketing & sales promotion programmes to be launched by the Government.

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