

Hypothetical correlation between major critical factors for transportation waste in automobile industries

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Abstract. Industrial transportation waste elimination is a major challenge faced by the experts in the day to day activities of production systems. Mainly there are seven types of industrial transportation waste in lean systems such as Defects, Overproduction of things not demanded by actual customers, Inventories awaiting further processing or consumption, Unnecessary over-processing, Unnecessary shifting of staff, surplus transport and products handling, expecting upstream methods to deliver, or for a machine to end process, operate to be completed. This paper mainly focuses on reviewing the seven types of muda over a period of time and especially focused on transportation waste. Various papers have been reviewed and suggested based on the methodology and area of work. The purpose of this review is to check the best methodology to reduce the transportation waste in the automobile industries for productivity improvement.

1. Introduction

The lean management makes it attainable to get a product that adapts to actual demand mistreatment the minimum quantity of resources and therefore minimizing the cost, with the suitable quality and extremely high speed of response. For this purpose, all activities that do not add value, called wasteful, must be eliminated, including inappropriate processes, unnecessary carriage, unnecessary movement, stocks of all kinds which would result in increased costs. Firms that have successfully reduced their internal waste through lean production methods also implement practices for higher environmental management. Lean production is a standard in the world automotive trade and is gaining ground in other manufacturing sectors and even service in industries. This process of waste reduction drove practices like inventory reduction, method simplification and the identification and elimination of non-value-adding tasks. Delay on the part of customers waiting for service, for delivery, in queues, for the response, not arriving as promised. One key reason may be that many

organizations have merely implemented isolated lean practices, something short of its underlying philosophy. That is, in implementing lean, perhaps some organizations allowed the practices to become ends in themselves, losing sight of the true end, an overall efficient and effective production system.

2. Literature review

Ma Ga(Mark)Yang et al.[1] stated that relationships between lean manufacturing practices, environmental management, and performance of the business. Taho Yang et al [2] stated that value stream mapping (VSM) is a useful tool for describing the manufacturing state, mainly for showing the difference between those activities that add value and those that do not. El-Awadyattiaanad Ashraf Megahed [3] stated that due to the strong competition, organizations should react instantly to the customer requirements by reducing lead times, or/and lowering manufacturing charges. William G. Sullivan [4] stated that conventional manufacturing

processes are developed on the principle of economies of scale. John S. W. Fargher [5] stated that several case studies of firms that the Missouri Enterprise has been involved as the facilitator and consultant. Carlos T. Formoso [6] stated that in the construction industries material waste has been found a major problem and that has major applications in both environmental impact of construction projects and for the efficiency. Nisha Vilasini [7] stated that waste factors and productivity are independent of each other. Yeqing Zaho [8] stated that the aim of this paper is to make a modeling method for complex material flow networks system of typical steel enterprise. Flitta and T. Sheppard [9] stated that this paper deals with the large batch sizes. Mainly in automobile industries, the manufacturing process is done in various segments. Gabor Bohacs, Angela Rankacs [10] stated that simulation techniques are almost indispensable in the analysis of complex systems. Peter Telek & Tamas Banyai [11] stated that the material flow systems have generally very complex structure and relations. This paper shows some usable solution for the design and selection process of material flow systems. Hohera [12] stated that multiscale simulation approach based on system dynamics is investigated and divided into microscopic and a macroscopic model scale some amounts of parts are stimulated. Richaud [13] stated that the use of textiles in transportation may be associated with the need to combine comfort and functionality. Xueping Zhen [14] stated that business interruption insurance and backup transportation have been widely used in distribution centers daily risk management [15] stated that materials handling is an important function of most chemical and process operation. It involves the receipt, storage and transfer of raw materials, finished goods and parts, as well as the disposal of materials and packing.

3. Problem statement

Transportation usually results in operations having to wait for the product to be delivered due to delays, thus costing you extra money as well as extending your lead times and making delivery issues. There are several causes that contribute to the waste of transport, the main thing is the being the waste of overproduction which results in the waste of inventory; inventory that they should be transported throughout your surroundings or between factories and even continents. The causes of this overproduction can be everything from extra setup times and the need for economic batch sizes to the fact that “that is the approach we have continuously done it. In addition to overproduction our organization's layouts usually cause the necessity to move product, we are often organized in functional silos, that is we have discreet areas for specific functions like welding, pressing, moulding etc. This result is to transport product from each of these areas to the next and at times back again after each function is completed. Even within each functional area, we have a tendency to leave excessive gaps between operations requiring the necessity to use things like pump trucks to move product.

3.1 Methodology

In this paper, the statistical methodology was used to find out the Hypothetical correlation between major critical factors for transportation waste in automobile industries. Literature survey has been conducted based upon the various transportation waste related papers. Based on the previous studies the problem has been identified. To investigate further a questionnaire has been framed and sent to the various automobile industrial experts. The collected feedback was analyzed using the SPSS software and results were given accordingly.

4. Results and discussion

4.1 Hypothesis 1. Have all the employers are through with complex material flow * Have all the employers are through with large batch sizes

Ho- There is no significant relationship between these all the employers are through with complex material flow and Have all the employers are through with large batch sizes

H1- There is a significant relationship between Have all the employers are through with complex material flow and Have all the employers are through with large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 8.158 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with complex material flow and Have all the employers are through with large batch size has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.158 ^a	9	.518
Likelihood Ratio	10.117	9	.341
Linear-by-Linear Association	1.545	1	.214
N of Valid Cases	52		

- a. 16 cells (100.0%) have expected count less than 5. The minimum expected count is 2.08.

4.2 Hypothesis 2. Have all the employers are through with complex material flow * Is any wastage happens with the large batch sizes

Ho- There is no significant relationship between these all the employers are through with complex material flow and Is any wastage happens with the large batch sizes

H1- There is a significant relationship between Have all the employers are through with complex material flow and Is any wastage happens with the large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 14.034 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with complex material flow and Is any wastage happens with the large batch size has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.034 ^a	9	.121
Likelihood Ratio	14.865	9	.095
Linear-by-Linear Association	.015	1	.901
N of Valid Cases	52		

a. 14 cells (87.5%) have expected count less than 5. The minimum expected count is 1.38.

4.3 Hypothesis 3: Is any steps are taken to operate complex material flow * Have all the employers are through with large batch sizes

Ho- There is no significant relationship between any steps are taken to operate complex material flow and Have all the employers are through with large batch sizes

H1- There is a significant relationship between Is any steps are taken to operate complex material flow and Have all the employers are through with large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 8.620 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Is any steps are taken to operate complex material flow and Have all the employers are through with large batch sizes has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.620 ^a	9	.473
Likelihood Ratio	11.713	9	.230
Linear-by-Linear Association	.060	1	.806
N of Valid Cases	52		

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.620 ^a	9	.473
Likelihood Ratio	11.713	9	.230
Linear-by-Linear Association	.060	1	.806
N of Valid Cases	52		

a. 16 cells (100.0%) have expected count less than 5. The minimum expected count is 2.31.

4.4 Hypothesis 4: Is any steps are taken to operate complex material flow * Are there any guidelines for large batch sizes handling

Ho- There is no significant relationship between the Is any steps are taken to operate complex material flow and Are there any guidelines for large batch sizes handling

H1- There is a significant relationship between Is any steps are taken to operate complex material flow and Are there any guidelines for large batch sizes handling

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 13.728 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Is any steps are taken to operate complex material flow and Are there any guidelines for large batch sizes handling has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.728 ^a	9	.928
Likelihood Ratio	12.031	9	.909
Linear-by-Linear Association	.047	1	.829
N of Valid Cases	52		

a. 15 cells (93.8%) have expected count less than 5. The minimum expected count is 1.35.

4.5 Hypothesis 5: Have all the employers are through with unnecessary material handling * Have all the employers are through with large batch sizes

Ho- There is no significant relationship between the Have all the employers are through with unnecessary material handling and Have all the employers are through with large batch sizes

H1- There is a significant relationship between Have all the employers are through with unnecessary material handling and Have all the employers are through with

large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 5.988 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with unnecessary material handling and Have all the employers are through with large batch sizes has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.988 ^a	9	.741
Likelihood Ratio	7.776	9	.557
Linear-by-Linear Association	.000	1	.986
N of Valid Cases	52		

a. 16 cells (100.0%) have expected count less than 5. The minimum expected count is 2.08.

4.6 Hypothesis 6: Have all the employers are through with unnecessary material handling * Is any steps are taken to operate large batch sizes

Ho- There is no significant relationship between the Have all the employers are through with unnecessary material handling and Is any steps are taken to operate large batch sizes

H1- There is a significant relationship between Have all the employers are through with unnecessary material handling and Is any steps are taken to operate large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 17.196 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with unnecessary material handling and Is any steps are taken to operate large batch sizes has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17.196 ^a	9	.046
Likelihood Ratio	22.318	9	.008
Linear-by-Linear Association	1.641	1	.200

N of Valid Cases	52
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a. 14 cells (87.5%) have expected count less than 5. The minimum expected count is 1.38.

4.7 Hypothesis 7: Have all the employers are through with unnecessary material handling * Are there any guidelines for large batch sizes handling

Ho- There is no significant relationship between the Have all the employers are through with unnecessary material handling and Are there any guidelines for large batch sizes handling

H1- There is a significant relationship between Have all the employers are through with unnecessary material handling and Are there any guidelines for large batch sizes handling

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 8.488 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with unnecessary material handling and Are there any guidelines for large batch sizes handling has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.488 ^a	9	.486
Likelihood Ratio	9.110	9	.427
Linear-by-Linear Association	.206	1	.650
N of Valid Cases	52		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is 1.21.

4.8 Hypothesis 8: Have all the employers are through with unnecessary material handling * Is any wastage happens with the large batch sizes

Ho- There is no significant relationship between the Have all the employers are through with unnecessary material handling and Is any wastage happens with the large batch sizes

H1- There is a significant relationship between Have all the employers are through with unnecessary material handling and Is any wastage happens with the large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 6.836 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with

unnecessary material handling and Is any wastage happens with the large batch sizes has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.387 ^a	9	.701
Likelihood Ratio	6.836	9	.654
Linear-by-Linear Association	5.753	1	.386
N of Valid Cases	52		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is 1.38.

4.9 Hypothesis 9: Have all the employers are through with unnecessary material handling * Weather any steps are followed to reduce the large batch sizes

Ho- There is no significant relationship between the Have all the employers are through with unnecessary material handling and Weather any steps are followed to reduce the large batch sizes

H1- There is a significant relationship between Have all the employers are through with unnecessary material handling and Weather any steps are followed to reduce the large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 8.615 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Have all the employers are through with unnecessary material handling and Weather any steps are followed to reduce the large batch sizes has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.615 ^a	9	.474
Likelihood Ratio	9.505	9	.392
Linear-by-Linear Association	.413	1	.520
N of Valid Cases	52		

a. 14 cells (87.5%) have expected count less than 5. The minimum expected count is 1.56.

4.10 Hypothesis 10: Is any steps are taken to operate unnecessary material handling * Have all the employers are through with large batch sizes

Ho- There is no significant relationship between the Is any steps are taken to operate unnecessary material handling and Have all the employers are through with large batch sizes

H1- There is a significant relationship between Is any steps are taken to operate unnecessary material handling and Have all the employers are through with large batch sizes

The observed degree of freedom for the chi-square test is 9 is 4.168 and but the calculated value is 8.259 which is greater than the table value So Ho is rejected and H1 is accepted it states that there is significant relationship between Is any steps are taken to operate unnecessary material handling and Have all the employers are through with large batch sizes has achieved a lot of benefits from the lean implementation over a period of 5 years in any manufacturing company.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.259 ^a	9	.508
Likelihood Ratio	8.296	9	.505
Linear-by-Linear Association	.253	1	.615
N of Valid Cases	52		

a. 16 cells (100.0%) have expected count less than 5. The minimum expected count is 1.38.

Conclusion

In hypothesis 1 the two factors are cross-tabulated between all the employers are through with complex material flow and all the employers are through with large batch sizes. In this analysis Ho is rejected and H1 accepted. So it states that there is a strong relation between all the employers are through with complex material flow and all the employers are through with large batch sizes.. In hypothesis 2 the two factors are cross-tabulated between all the employers are through

with complex material flow and any wastage happens with the large batch sizes in this analysis and H_0 is rejected and H_1 accepted. So it states that there is a strong relation between all the employers are through with complex material flow and any wastage happens with the large batch sizes. In hypothesis 3 the two factors are cross-tabulated between any steps are taken to operate complex material flow and all the employers are through with large batch sizes in this analysis. H_0 is rejected and H_1 accepted. So it states that there is a strong relation between any steps are taken to operate complex material flow and all the employers are through with large batch sizes. In hypothesis 4 the two factors are cross-tabulated between any steps are taken to operate complex material flow and there any guidelines for large batch sizes handling in this analysis H_0 is rejected and H_1 accepted. So it states that there is a strong relation between any steps are taken to operate complex material flow and there any guidelines for large batch sizes handling. In hypothesis 5 the two factors are cross-tabulated between all the employers are through with unnecessary material handling and all the employers are through with large batch sizes H_0 is rejected and H_1 accepted. So it states that there is a strong relation between all the employers are through with unnecessary material handling and all the employers are through with large batch sizes. In hypothesis 6 the two factors are cross-tabulated between all the employers are through with unnecessary material handling and any steps are taken to operate large batch sizes H_0 is rejected and H_1 accepted. So it states that there is a strong relation between all the employers are through with unnecessary material handling and I_s any steps are taken to operate large batch sizes. In hypothesis 7 the two factors are cross-tabulated between all the employers are through with unnecessary material handling and there any guidelines for large batch sizes handling in this analysis H_0 is rejected and H_1 accepted. So it states that there is a strong relation between all the employers are through with unnecessary material handling and there any guidelines for large batch sizes handling. In hypothesis 8 the two factors are cross-tabulated between all the employers are through with unnecessary material handling and any wastage happens with the large batch sizes in this analysis H_0 is rejected and H_1 accepted. So it states that there is a strong relation between all the employers are through with unnecessary material handling and any wastage happens with the large batch sizes. In hypothesis 9 the two factors are cross-tabulated between all the employers are through with unnecessary material handling and any steps are followed to reduce the large batch sizes in this analysis H_0 is rejected and H_1 accepted. So it states that there is a strong relation between all the employers are through with unnecessary material handling and any steps are followed to reduce the large batch sizes. In hypothesis 10 the two factors are cross-tabulated between any steps are taken to operate unnecessary material handling and all the employers are through with large batch sizes in this analysis H_0 is rejected and H_1 accepted. So it states that there is a strong relation between any steps are taken to operate unnecessary material handling and all the employers are

through with large batch sizes. Hence all these factors shows that reduction of these waste in the industrial environment improves the profit level of the organization.

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