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THE MODERATING EFFECT OF QUALIFICATION IN THE NEXUS VALUE STREAM MAPPING AND PRODUCTIVITY IMPROVEMENT

a Taher Hameed Abbas Bahiya ,
PhD student at Manouba University, Tunisia
Email: taher.hemeed.idi22@atu.edu.iq

b Pro.Dr. Houda Hakim Guermazi,
Manouba University, Tunisia
Email: houda.hakim.guermazi@ensi-uma.tu

ABSTRACT
This study aims at finding out the impact of the value stream mapping strategy and investing it as a technique to improve productivity, which enables the organization to achieve a competitive position that will bring it success and sustainability. To achieve the purpose of the study, a questionnaire was adopted. The sample of the study involved 137 employees from different departments of Al- Diwaniyah Tires Factory. According to the purpose of the study, a main hypothesis was formulated, A set of statistical methods were used through the statistical program (Spss vr.24) and (AMOS vr.24) programs. It is hoped that this study will be of value in a step to enrich thought in an attempt to identify the reality and level of application of the value stream mapping as a strategy to improve the performance of the organization and attempt to draw attention to the need to adopt a value stream mapping as an influential factor in productivity improvement. In addition, this research explore the moderating variables that can affect this relationship. Several conclusions have been come up with Including: the existence of a significant direct effect of the value stream mapping in the productivity improvement and qualification as a moderating variable in the relationship.

Keywords: Value Stream Mapping, Lean Manufacturing, Productivity Improvement, qualification.

Introduction

Due to the challenges facing contemporary organizations and the rapid changes in the business environment, which is characterized by a high degree of complexity and creative chaos, it is now necessary to adopt strategies, plans, and behaviors that help accomplish the intended outcome when addressing the current and anticipated difficulties in the future to gain a competitive advantage and make optimal use of the resources at hand. The lean manufacturing, which is the backbone of the application of lean systems, with value stream mapping as one of its most crucial techniques, as well as the expansion of continuous

improvement initiatives. Based on the resource view (Barney, J. B.,1991), the lean manufacturing focus on efficient use of staff and available resources to reduce costs and better serve customers beyond the physical boundaries of the organization (Gao, X., & Zou, B.,2022). Furthermore, it is one of the modern entrances and a philosophy that uses modern methods for planning and carrying out operational duties at both the strategic and operational levels (Wang, Y. et al (2018). Instead of keeping with the traditional methods and procedures, the entire staff of the organization must be dedicated to and participating in managing the transformation process utilizing this strategy and its tools. and to devote the idea of adapting to unforeseen changes and making effective situational decisions to ensure the success and continuity of the organization by keeping up with environmental changes. Additionally, it is important to improve the inventiveness of technology systems (Lee, K. M., & Kang, S. H., 2021), because they constitute a strategic process to increase productivity and motivate the development process toward achieving goals. Based on performance theory, the present study aims at finding out the relationship between value stream mapping and productivity improvement in the organization and detecting the level of productivity improvement of the sample of the study. In addition, moderating effect in this relationship present a gap in the literature.

The study's significance stems from the topic's modernity, which energized the interest of academics and those with an interest in administrative and strategic thought. This interest led to the conduct of additional studies and research, or the provision of visions that contribute to success and institutional excellence, as well as an effort to highlight the adoption of this philosophy as a successful business strategy. The problem of the study is focused on the impact of using the value stream mapping on improving the productivity of the organization. To be more specific, the problem of the study is concerned with finding out answer to the following question: To what extent does the use of the value stream mapping affect the productivity sample of the study? And what are the moderating variables that can affect this relationship.

THEORETICAL FRAMEWORK

1. Value Stream Mapping

A. Value Stream Mapping Concept

It is an essential Lean technology that was first created by Toyota and made public in 1995 by (Hines, Rich). It was also made well-known by the book (Learning by Vision) by (Rother & Shook, 1998), and it is a vital part of lean transformation since it offers a crucial blueprint for the kinds of modifications that must be made while moving from one environment to another where physical flows are going smoothly from one process to another rather than making separate improvements to individual activities within a process that adds more value (Barbara, 2011:23). It is a graph of the flow of activities in the process using various symbols such as stock, delay, waiting, and check. This clarifies how to transit between the jobs (Kadam, et al., 2012:28). Although the opinions of researchers and writers differed about

the concept and nature of using the value stream map according to the different goals and research environment, they were able to identify concepts and commonalities.

According to Sondalini (2005: 2), it is a systematic methodology to identify procedures and lost time in the manufacturing process, used to re-organize business and projects, as it identifies unnecessary resources and efforts to be able to simplify and direct operational processes.

Beckman & Rosenfield (2008: 36) define it as a tool for clarifying and understanding the flow of materials and information as a good or service makes its way through the value stream of the process from receiving raw materials to delivering the good or service to the customer.

Singh, et al., (2010:159) point out that it is a project improvement tool, which helps to see the entire production process, represented in the stream of both materials and information to identify all kinds of waste in the value stream and take the necessary steps to eliminate them.

Suciu, et al., (2011: 184) sees it as an analytical method that presents in detail all the productive steps to analyze the current situation, identify areas of waste and find solutions to improve the process.

Krajewski, et al., (2013:307) assert that it is a qualitative, agile waste removal tool that includes mapping the current state, mapping the future state and an implementation plan.

For Schroeder & Goldstein, (2018: 116) it is a tool that creates a visual representation of the value stream of a process and requires direct monitoring of the work and workflow within the process, which enables the organization to identify opportunities for improvement.

According to what is mentioned above, and Based on the Socio-Technical System Theory(Bostrom & Heinen, 1977a, 1977b): value stream mapping represents a lean visual technique used in the redesign of production systems by displaying the physical and informational flows concerning all activities (that add value and those that add cost and not value) necessary to provide a good or service to the customer, providing a common language to discuss the process manufacturing, evaluation of the current process to identify where and sources of waste, and a tool that contributes to shaping the change process in the organization. Based on value theory (Adam smith) value stream mapping shows the approach of future improvement by creating a better flow vision towards the value expected by the customer.

B. The Importance of Value Stream Mapping

It is one of the Lean manufacturing techniques that help organizations get a thorough understanding of the production process, enabling them to detect every sort of waste in the value stream and take the appropriate action to get rid of it. It is one of the most effective lean procedures for the organization looking forward to designing, implementing, and improving in accordance with the lean approach (Silva, 2012:41). Its primary goal is to guarantee the accuracy of every step to create a proper production hierarchy. Its significance is derived from the advantages it offers the company, including it: provides a clear view of

the flow of materials from raw materials to the final product, providing everything that helps to make the flow easy and clear, and providing an understanding of the processes that create value for the customer by giving a broad view of the entire flow that helps to determine waste(Chaple & Nakhede, 2017:56). Similar to the integrated system procedure (Hakim Guermazi H., Mbarek I.,2016), Value Stream Mapping supplies a simple and unified method to deal with procedures, clarifies decisions, enables earlier discussion of prospective adjustments and improvements, serves as the foundation for an action plan. VSM develops a deep awareness of the interdependence of each function and the entire process if the value stream map is built by a team that represents all stages of the process and all functions. It also emphasizes the main types of waste existing in the operating process, it affords some pieces of evidence regarding the waste's underlying sources. Focusing on decision theory(Simon H.) and similar to a dashboard, (Hakim Guermazi H. & Fourati M.A., 2016), The VSM offers data to measure performance improvements as well as a model for developing a better future state and choose rational decision. In addition to focusing on problems that affect process performance and helping to identify any potential problems in the information that cannot be easily identified within the production system, it helps to create improvement plans once waste in the production process has been identified. This provides a solid foundation for making improvements. (Chaple & Nakhede, 2017:56)

C. Value Stream Mapping Tools

Given that many of the tools for this map have been used to enhance and redesign manufacturing systems to make them more efficient, flexible, and competitive to meet the economic market challenges in their taxonomic environment, researchers and practitioners have found the emphasis on value stream map to be a major issue. These tools were initially developed by (Hines & Rich) in 1995 in response to a broad identification of the seven types of waste previously known (Ohno). Such tools were created to help lean practitioners identify waste and appropriate ways to improve (Wan, et al., 2007:2). The tools: process activity mapping, supply chain response matrix, production variety funnel, quality filter mapping, demand amplification mapping, decision point analysis, and physical structure mapping, (Hines&Rich, 2013:50).

D. Value Stream Mapping Limitations

The value stream map offers some core issues, many of which are related to the context of introducing the new product, and several of them have been reconsidered by scholars in the value stream map literature (Gidley, 2004:3). This indicates that the value stream map becomes very difficult in the unconnected product development processes, where there is no product, there is high diversity / low volume.

Forno et al., (2014:781) identified these obstacles as follows: fluctuation in process, complex process stream, low or no integration between processes, unclear procedures, lack of modular products (when products are not modularly designed), the presence of low-skilled personnel, instability of the process (due to lack of standards), the difficulty of measuring

data in operations, the obsolescence of value stream mapping cases, small batches and high production mix, production is very flexible. It is an intuitive process that is highly dependent on the operator who decides when and how the product should go into production, management does not support the implementation of the value stream map.

2.Productivity Improvement

A. productivity Conceptualization

The concept of productivity has attracted the attention of many writers and researchers in the field of specialization. There were purposeful attempts to give an inclusive clarification since it involves different meanings, once it refers to the efficiency of the worker Hakim Guermazi H., Kessentini A. (2017) and the other to the outputs to be achieved in relation to the inputs, and goes beyond that to reach the state of societal well-being, each according to his philosophy and intellectual background.

According to Sanjeev (2002:27), it is the possibility of producing some goods and services of equal or better quality with fewer units of production elements during a specified period.

In the same line, Heizer& Render (2004:13) believe that it is the ability to create results using specific production elements.

Chandra (2013:4051) asserts that it is the true source of competitive traits that produce economic ability over a long time and a standard of living for all.

According to Yadav and Marwah (2015:192), it is a rate to measure an organization's ability to transform inputs into products and services.

Saini (2018: 102) refers to it as efficiency in production. It is the amount of output obtained by gathering efforts.

Considering resource scarcity and market demand, the researchers believes that lean productivity, which emphasizes waste elimination, continuous improvement, and quality, is a suitable concept for our study. The ratio between the outputs achieved with quality to the inputs used with quality in the production process is a measure of the effective use of those resources. According to what is mentioned above and based on the theory of Effectiveness (Argyris C.,1970), (Argyris, C., & Schon, D. A.,1974); (Ronald A.,1985). it is one of the keys to financial success in the organization, allowing it to remain competitive in the market and strengthening the social component in the development of society. Productivity can be used to determine the pace of economic expansion and development in a specific country.

B. Productivity Importance

Productivity is an important indicator by which we can infer the degree of development and progress of the national economy in any country (Hamada, K., Matsui, Y., & Nakamura, M. ,2021; Hakim Guermazi H. et al. (2021).. It is the lifeblood of many countries, and its importance increases in those whose economies are defined by a scarcity of productive resources, whether they be human or material, which stimulates improved use of what is presently available to obtain an acceptable investment income for them (Hammoud & Fakhoury, 2009: 48).

The importance of productivity can be determined by the following points: (Wafaa, 2017:56)

- An important element in the success and sustainability of organizations.
- An important element in achieving profits, which represents a source of capital formation and self-investment for organizations.
- An important activity in expanding the scope of the market by providing more goods and services to satisfy the needs of society.
- An important element to the effective utilization of productive potential and the subsequent creation of job possibilities.

C. Productivity Dimensions

Sakamoto (2010:67-74) and Almström & Kinnander (2011:760) assert that productivity can be improved by increasing output or decreasing input. To achieve this, it is necessary to focus on improving three essential dimensions: (Al Rubai, 2019: 94-95)

- Method: This dimension is regarded as the most prevalent one, and its main purpose is to improve productivity. It can be classified into two types: hardware and software. Devices represent everything related to machines, tools, arrangement, and the like, and devices usually have long-term effects when making any change in the organization. As for software, it involves patterns of movement, organization, training, and support. The software change can create effects that will last as long as the improvement is maintained.

- Performance: This dimension focuses on motivating individual or machine speed. It is often emphasized as being a means to increase productivity. Machine speed can be increased by reducing disruption and stops. Performance can be reached by measuring and comparing the standard and actual time .

- **Utilization:** This dimension refers to either machines or humans. It denotes the percentage of time that is planned to be used in activities that make value. Because of the technical instability, common losses can occur for both humans and machines to suffer losses. This might be attributed to the weakness of equipment, a decrease in material supply, or any other changes. The planning and control of production, facility maintenance, and quality control are regarded as activities that are related to the utilization dimension. The increase in utilization results in a decrease in stock, waiting time, and cycle time.

Each of these dimensions has a special contribution to productivity. The method dimension contributes to effectiveness, whereas the performance dimension influences efficiency. On the other hand, the dimension of utilization cannot provide clear results apart from productivity and performance. Therefore, the collaboration of these three dimensions concerning development is ultimately the aim that will more effective. productivity total improvement can be calculated by multiplying these three variables: Method, Performance, and Utilization.

Moderating variables in the relationship: VSM -PI

In order to more understand the effect of VSM on PI, it seems imperative to improve the idea and including moderating factors to explore more and more the phenomena. Particularly, Wang, Wu, & Wang, (2009) use gender and age as moderators in some relationships. For improving productivity by quality management, Wang, C., and Ahmed, P. K. (2007) focus on employee involvement as a moderating variable. Besides Bryson, J. M., & Mobley, M. F. (2017) consider technology adoption as a moderating variable. Therefore, in this research we propose demographic variables (age, gender, qualification, Number of years of experience in the current organization and Current job field). Based on this literature, the following assumption are put forward :

H1: Value Stream Mapping has a positive effect on productivity improvement

H2: demographic variables has a moderating effect on value Stream Mapping and productivity improvement nexus.

In our study, we propose the following model in figure 1

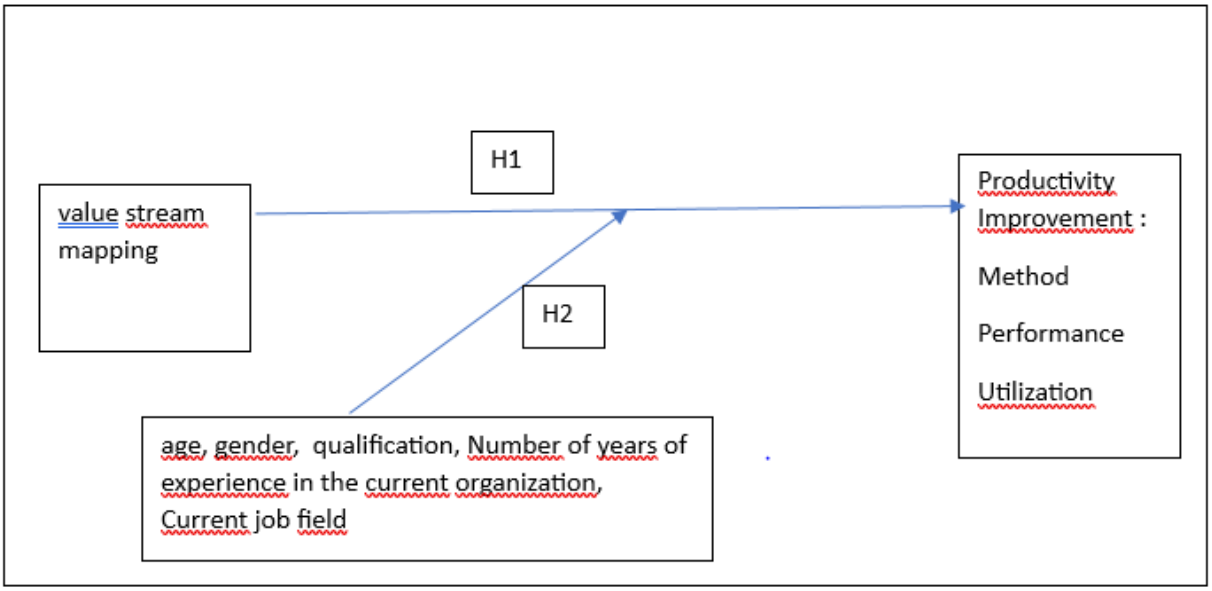

Figure No. (1) 1: Research model

EMPRICAL FRAMEWORK

Method and the instrument

In this research we used the positivist paradigm, in which the researcher used method to describe phenomena rigorously and objectively (Lapointe, P. A.,1996).We use the uestionnaire to conduct the survey. 137 individuals were involved in this study. They were randomly selected from Al- Diwaniyah Tires Factory. For data collecting we use a questionnaire.

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Measures

To study the effect of VSM on PI, we used a 5 points Likert scale for items for each variables (Thietart, 2007). For each construct, we determine lists of items based on literature and international practices. The items are presented in the following table

Table No. (1) items of constructs

Constructs	Item description
value stream mapping (VSM) Adapted from Anders,2011 -Goehner, Lara & Carlos, Luiz & Albergaiai, Renata(2016) ,	Five items reflect: identifying non-essential activities during project Providing information helps strengthen communication processes adopting activity charts to evaluate the actual work and reduce deviation from the lean approach using roadmap for Lean Manufacturing Inspection and measurement
Productivity Improvement (PR.IM) Adapted from Raveen, Rathilall, (2011) Patrick, Mikalef & Adamantia, Pateli (2017)	Five Items reflect: comparing with competitors in ROI comparing profits as a percentage of sales earnings growth rates comparing reducing operational costs. increasing market share.

STATISTICAL ANALYSIS

The questionnaire reliability was checked using Alpha Cronbach. The internal consistency coefficient is 0.78, which is reliable. After distributing the questionnaire to the sample of the study, data were collected by using the SPSS program. The result was obtained by using different statistical means such as graphs, arithmetic mean, standard deviation, coefficient of variation, the direction of the answer, and relative and analytical importance such as linear regression Confirmative factor analysis, and t-test.

Frequencies and percentages were found according to the general information of the study sample that included (gender, age, qualification, current job field, number of years of experience in the current organization.) and the following table includes the numbers and percentages:

Table No. (2) The Numbers and Percentages:

		The Number	The Ratio
Gender	Male	111	81.0
	Female	26	19.0
	Total	137	
The Age	less than 30 years old	22	16.1
	to less than 40 30	32	23.4
	to less than 5040	67	48.9
	From 50 years and over	16	11.7
	Total	137	

Qualification	Diploma	14	10.2
	BA	98	71.5
	Master's	19	13.9
	PhD	6	4.4
	Total	137	
Current job field	Artworks	17	12.4
	Non-supervisory administrative work	18	13.1
	Supervisory administrative work	102	74.5
	Total	137	
Number of years of experience in the current organization	Less than 5 years	8	5.8
	From 5 to less than 10 years	18	13.1
	From 10 to less than 15 years	97	70.8
	From 15 years and over	14	10.2
	Total	137	

Tables of Frequencies

Here, the frequencies and their ratios will be found for each item

Table No. (3) Frequencies and Their Ratios for the VSM and PR.IM. Axes

		Strongly disagree	disagree	undecided	Agree	Strongly agree
VSM1	Frequency	0	0	0	55	82
	Percent	0	0	0	40.1	59.9
VSM2	Frequency	0	0	8	63	66
	Percent	0	0	5.8	46.0	48.2
VSM3	Frequency	0	0	0	52	85
	Percent	0	0	0	38.0	62.0
VSM4	Frequency	0	0	8	40	89
	Percent	0	0	5.8	29.2	65.0
VSM5	Frequency	0	1	3	64	69
	Percent	0	0.7	2.2	46.7	50.4
VSM	Frequency	0	1	19	274	391
	Percent	0.0	0.1	2.8	40.0	57.1
		Strongly disagree	disagree	undecided	Agree	Strongly agree
PR.IM1	Frequency	0	3	8	47	79
	Percent	0	2.2	5.8	34.3	57.7
PR.IM2	Frequency	0	1	15	52	69
	Percent	0	0.7	10.9	38.0	50.4
PR.IM3	Frequency	1	0	12	43	81
	Percent	0.7	0	8.8	31.4	59.1
PR.IM4	Frequency	0	2	13	46	76
	Percent	0	1.5	9.5	33.6	55.5
PR.IM5	Frequency	1	4	7	50	75
	Percent	0.7	2.9	5.1	36.5	54.7
PR.IM	Frequency	2	10	55	238	380
	Percent	0.3	1.5	8.0	34.7	55.5

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The above table shows that the direction of the answers of the study sample tends to completely agree on the items of the two axes. The following graph shows the ratios of the answers to the two axes, which proves what the researchers went with regarding the direction of the sample answers:

Graph No.(1) The Percentages of the Sample's Answers about the two Axes of the Questionnaire

- Confirmatory Factor Analysis:

One of the important objectives of the confirmatory factor analysis method (which belongs to the applications of the SEM (Sequential Equation Modeling)) is to measure the strength of the items' affiliation to the axes to which they belong, and from it, the weak items can be identified and excluded, if any. This method involves two types of variables: latent variables which represent the axes and endogenous variables which represent the items attached to those axes.

In addition, to know the accuracy of the mathematical model's fit, some indicators are used based on which the proposed model is accepted or rejected, including the Incremental Fit Indexes, which depend in its estimation on comparing the assumed model with the null model, in which one general factor is assumed to be saturated It contains all the measured variables, and its indicators include the CFI Comparative Fit Index and the IFI Incremental Fit Index, and the values of those indicators are between zero and the correct one, as a higher value indicates a better fit of the model with the sample data. Two structural models were formed for the paragraphs of the questionnaire, the first for the VSM axis and the second for the PR.IM axis, as in the following two figures:

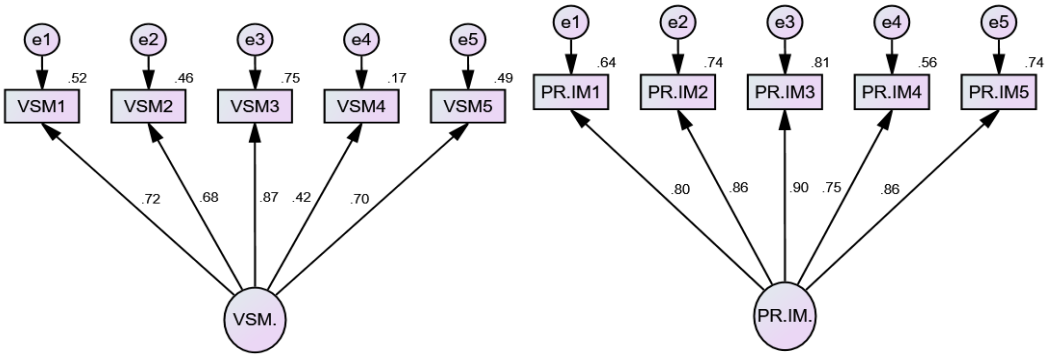

Figure No. (2) Confirmatory Factor Structured Scheme for the Items of the Questionnaire

The criteria for the accuracy of the confirmatory factorial construction model are included in the table below:

Table No. (4) Model Fit Summary

Model	IFI	CFI
VSM	.886	.883
PR.IM	.998	.998

According to the results of table 4, the assumption that the items are measured for their axes is accepted and that the values of the standard regression coefficients (values above the straight lines directed from the axes to the items) that represent the amount of participation (or influence) of each item in forming the axis, in other words, for example, the first item (VSM1) of the first axis participated in its construction by 0.72, and it is also explained that the increase in the value of the first item (VSM1) by 0.72 standard deviations leads to an increase in the value of the first axis by one standard deviation. Accordingly, it can be concluded that the items participate in constructing the axes in different amounts. Table 4 below includes the estimated values of the standard regression coefficients for the resolution items in addition to the values of the coefficients of determination (multi-correlation boxes):

Table No. (5) Standard Regression Coefficients of the Questionnaire Items

Path	Standardized Regression Weights	Squared Multiple Correlations	Path	Standardized Regression Weights	Squared Multiple Correlations
VSM1 <--- VSM.	.720	.519	PRIM1 <--- PR.IM.	.797	.636
VSM2 <--- VSM.	.680	.462	PRIM2 <--- PR.IM.	.860	.740
VSM3 <--- VSM.	.869	.754	PRIM3 <--- PR.IM.	.898	.806
VSM4 <--- VSM.	.418	.175	PRIM4 <--- PR.IM.	.750	.563
VSM5 <--- VSM.	.697	.486	PRIM5 <--- PR.IM.	.860	.740

Some general statistics were found represented by the arithmetic mean, standard deviation, and coefficient of variation and the relative importance of each item of the questionnaire axes. Table 5 below shows the values of the statistics mentioned above for the two axes of the questionnaire:

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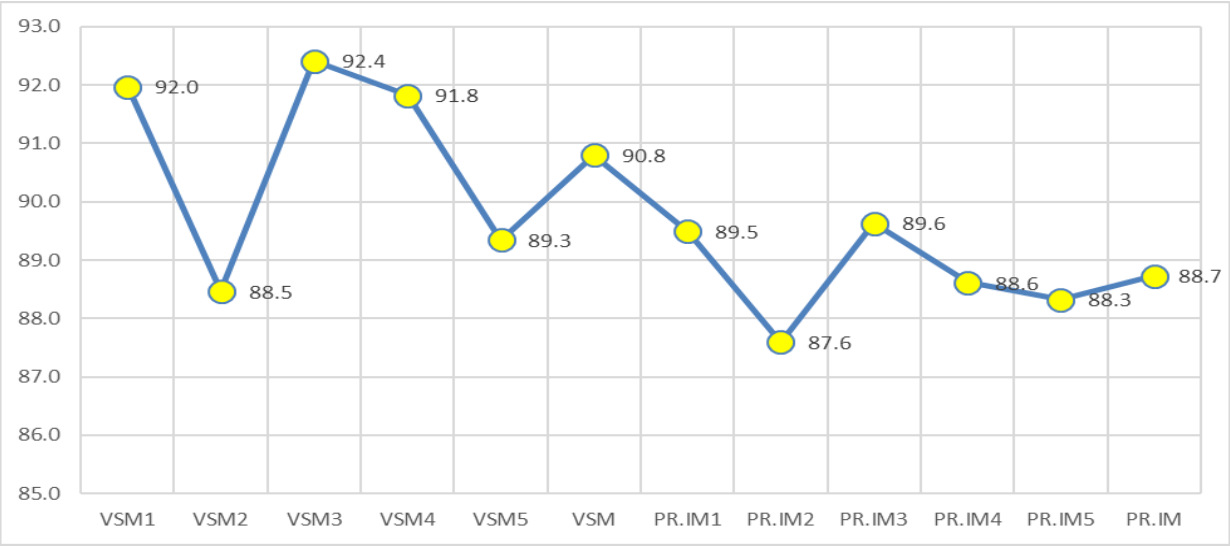
Table No. (6) Statistical Values for the two Axes of the Questionnaire

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std. Deviation	cv	Relative Importance Ratio
VSM1	137	4	5	4.60	0.492	11	92.0
VSM2	137	3	5	4.42	0.603	14	88.5
VSM3	137	4	5	4.62	0.487	11	92.4
VSM4	137	3	5	4.59	0.601	13	91.8
VSM5	137	2	5	4.47	0.582	13	89.3
VSM	137			4.54	0.301	7	90.8
PR.IM1	137	2	5	4.47	0.708	16	89.5
PR.IM2	137	2	5	4.38	0.708	16	87.6
PR.IM3	137	1	5	4.48	0.718	16	89.6
PR.IM4	137	2	5	4.43	0.726	16	88.6
PR.IM5	137	1	5	4.42	0.783	18	88.3
PR.IM	137			4.44	0.574	13	88.7

The results of table 5 show that there is a divergent trend for the sample members towards the items of this axis, as they sometimes agree more for one of the items, while their agreement is less for another item, as is noticed through the relative importance of each item. It is indicated that the third item of the VSM axis had the greatest relative importance. In other words, the sample members agree more about it, whereas their agreement about the second item of the PR.IM axis was the least. This means that they agree less about it and so on for the rest of the items. The following graph shows the relative importance of each of the two axes' items



Graph No. (2) the relative importance of each of the paragraphs of the two axes

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-Resolution stability

The results of Cronbach's alpha coefficients for the two axes prove the reliability and validity of the questionnaire, as shown by the results in the table below, and this leads to the conclusion that the questionnaire form can analyze and generalizing its results to the studied community:

Table No.(7) Reliability Statistics

Variable	No. of Items	Cronbach's Alpha
X	5	0.80
Y	5	0.92
All	10	0.91

- Analysis of the impact of the VSM axis on the PR.IM axis:

The effect of VSM in PR.IM will be discussed here, as the hypothesis was formulated as follows:

H1: There is a statistically significant effect for the VSM axis in the PR.IM axis.

The proposed model according to the SEM model was formed in the form of a structural equation and as shown in the following figure:

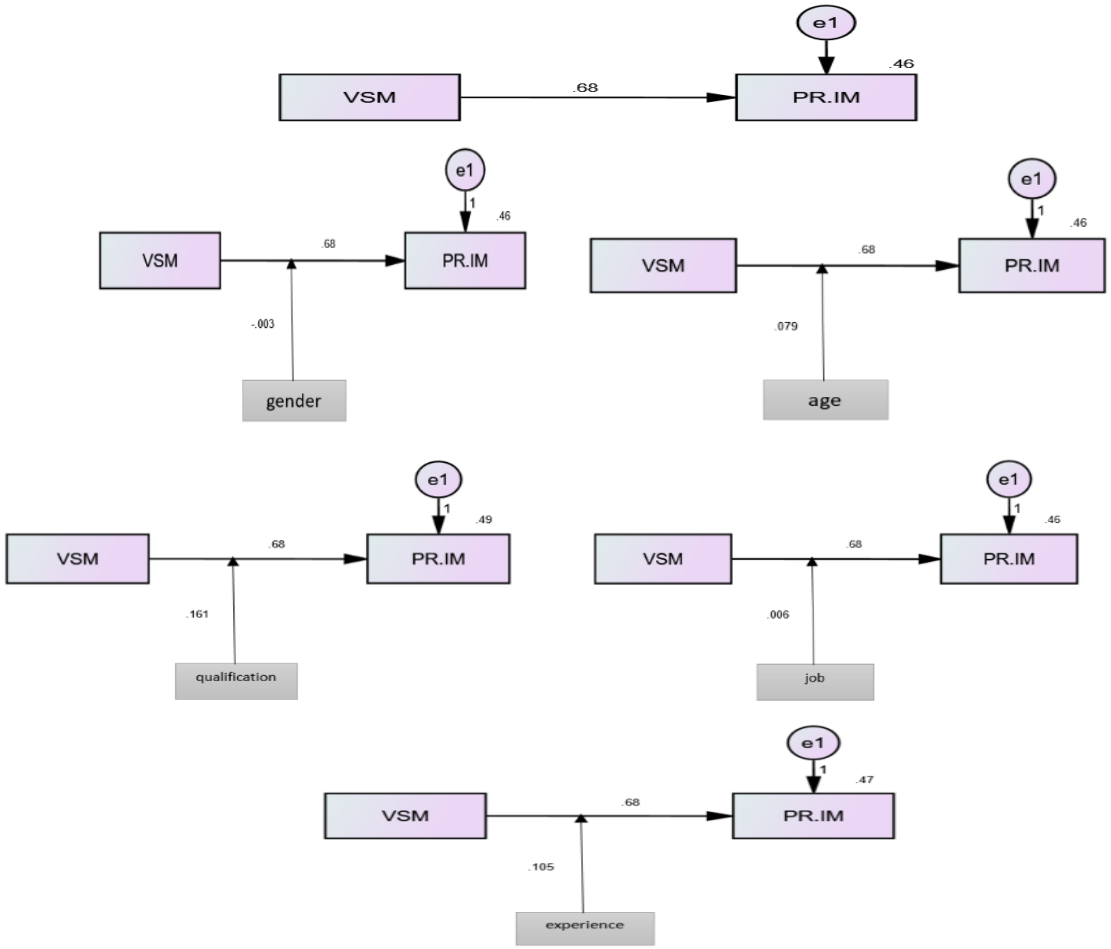

Figure No. (3) The proposed model for the effect of the VSM axis on the PR.IM. axis and moderating effect

The following table shows the obtained results of the regression analysis:

Table No. (8) Regression Analysis Results

independent variable	dependent variable	The coefficient of determination R^2	regression parameter value	Calculated t value	the significant value of t Sig.	The decision
VSM	PR.IM	46 %	0.68	10.780	.000	Significant below 5% significance level.
VSM X gender		.463	-.003	-.053	.958	Not Significant above 5% significance level.
VSM X age		.469	.079	1.225	.223	Not Significant above 5% significance level.
VSM X qualification		.487	.161	2.534	.012	Significant below 5% significance level.
VSM X job		.463	.006	.092	.926	Not Significant above 5% significance level.
VSM X experience		.472	.105	1.565	.120	Not Significant above 5% significance level.

The value of the coefficient of determination was 0.46, which means that the regression model explained 46% of the total deviations and the remaining is due to other variables not included in this research. The value of the regression parameter was 0.68 and its t-value was 10.78, and its significance (sig) is equal to 0.00, which is less than the significance level of 5%, and this indicates that it is significantly below the significance level of 5%. It is clear from the results of Table (7) that there is a positive effect of the modified variable represented by educational attainment with the VSM variable, as the value of the determination coefficient for it was 0.487 and the value of the regression parameter for them was 0.161 with a t-test value of 2.534 with a significant significance of 0.012 and this last value Less than the level of significance assumed by the researchers 5%, and the above results indicate agreement or disagreement on the items of the VSM variable. We are closely related to the educational degree of the respondent, as those with high academic achievement tend to agree strongly on the items of the VSM variable, and vice versa.

Results Discussion

The result of our research confirms that VSM has a positive and significant effect on productivity improvement. Our research is based on data related to industrial company precisely on Tires Factory. In line with the results of Tapping, D., and al (2012) who found

that VSM eliminate non-value activities and improve 22% of productivity on manufacturing process. In addition, Cho, Y. J., & Kang, K. H. (2013) confirm results that VSM enhance information flow, decrease lead time, and can improve until 31% of the productivity on food company. Our research confirms also that VSM detect and eliminate waste. This result confirms those of Dhingra, S., & Singh, S. (2014) on a pharmaceutical company and those of Cho, Y. J., & Kang, K. H. (2013).

In our research, we also propose to study if demographic variables could have a moderating effect on VSM and PI relationship. The finding is interesting since qualification moderate the VSM and productivity improvement. Hence, qualification can improve productivity through increasing ROI and market share, the percentage of sales, earnings growth rates and reduce operational costs. However, previous research focused on the direct relationship between the dependent and independent variables. Moreover, some studies focused on employee participation Sungwoo Shin, et al., (2016) as a moderating variable, for Rahman, S., & Butt, M. M. (2019), they present supplier involvement as a moderating variable. Our findings enrich literature results on moderating variables. Hence our research improves theory and practice to strengthen the VSM- productivity improvement relationship.

In our knowledge, there are no studies which investigate age or gender or year of experience in VSM and Productivity improvement. Our finding enrich and present an important idea for managerial theory and practice by presenting the fact that regardless age, gender or experience of human resources in the company, VSM improve productivity.

CONCLUSION

it has been concluded that the direction of the answers for the studied sample tends to completely agree on the items of the two axes. The items participate in building the axes in different amounts, based on the confirmatory factor analysis. The results showed that there was no effect for all modified variables (gender, age, job, experience) except for the educational qualification variable when it overlapped with the independent variable VSM. The results of Cronbach's alpha coefficients for the two axes prove the reliability and validity of the resolution. The A one-unit increase in Value Stream Mapping leads to a 68% increase in Productivity Improvement is a significant direct effect of the Value Stream Mapping axis on the Productivity Improvement axis. There is a direct and significant effect of the value stream mapping in the axis of productivity improvement. The answers of the surveyed sample reflected a positive trend of the importance of research in this field as a business philosophy and strategy based on the transformation into an lean organization, This results are consistent with both studies (Abdulmalek & Rajgopal, 2007); (Singhetal.,2010); (Jasti&Sharma,2014); (Nallusamy&Saravanan,2016); (Chowdhury et al., 2017).

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Appendix(1) Questionnaire Form

Personal Information:

1. Gender: Male ☐ Female ☐
2. Age: 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐
3. Educational Level: Ph.D. ☐ Master's ☐ BA ☐ Diploma ☐
4. job position: ☐
5. Years of Service: less than 5 years ☐ 5 -10 years ☐ more than 10 ☐

Note: Please put (√) in the field best suits your honest opinion according to the occurrence of each variable in your organization, knowing that this questionnaire has been developed for scientific research purposes and its validity depends on its results.

Component 1: Value Stream Mapping (VSM)

#	Items	Strongly agree	Agree	undecided	Disagree	Strongly disagree
1	Factory management continually identifies non-essential activities during project progress with a view to eliminating them.					

2	Providing information through the activity flow map helps strengthen communication processes within the factory.					
3	Factory management adopts future activity flow charts to evaluate the actual work and reduce deviation from the lean approach.					
4	There is a consistent roadmap for the implementation of Lean Manufacturing.					
5	Inspection and measurement are carried out at the end of each process and after assembling the entire product.					

Component 2: Productivity Improvement (PR.IM)

#	Items	Strongly agree	Agree	undecided	Disagree	Strongly disagree
1	Our performance is much better than our main competitors in ROI.					
2	Our performance is much better than our main competitors in profits as a percentage of sales					
3	Our performance is much better than our main competitors in earnings growth rates.					
4	Our performance is much better than our main competitors in reducing operational costs.					
5	Our performance is much better than our main competitors in increasing our market share.					