



Performance Analysis of Educational Institute before & after Digitalization of Management by Application of Qualitative Research Methodology

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Abstract

The digitalization of management refers to the integration and utilization of digital technologies, tools, and data-driven approaches to enhance and optimize various aspects of managerial functions and decision-making process within organizations. The digitalization of management revolves around leveraging technology and data to optimize managerial practices, foster innovation, and navigate the complexities of today's dynamic business environment. It requires a shift in mindset, organizational culture, and the adoption of new tools to stay competitive and responsive to market changes. The presented research article mathematically investigates the improvement in overall performance of an educational institution after the implementation of the digitalization in management practice of respective institution. The investigation is done using one parameter, that is Overall Utilization Factor of Educational Institution, which is algebraic summation of Faculty Utilization Factor (FUTF), Staff Utilization Factor (SUTF), Infrastructure Resources Utilization Factor (INFUTF) and Associated Resources Utilization Factor (ASFUTF). These factors are defined and mathematically formulated. Four Survey Questionnaires were designed to investigate the opinion of different category of stack holder of Institutes. The result of four survey response were mathematically concluded and the result is utilized to calculate individual factor and then after the overall utilization factor. A significant improvement is observed in utilization factor after the implementation of digitalization in management of institution.

I. Introduction

The performance of an educational institute refers to its ability to effectively and efficiently achieve its goals, deliver high-quality education, and contribute positively to the learning and development of its students. This concept encompasses various aspects and indicators that assess the institute's effectiveness in providing a conducive learning environment and producing successful graduates. The performance of an educational institute is multifaceted and encompasses academic, administrative, and societal aspects. It is evaluated based on its ability to provide a holistic education, foster personal and professional growth, and contribute positively to the advancement of knowledge and society. Here are some key dimensions that contribute to the performance of an educational institute:

- 1. Academic Excellence:** This includes factors like student achievement, graduation rates, exam results, and academic honors. A high-performing educational institute consistently demonstrates strong academic outcomes across various disciplines.
- 2. Teaching Quality:** The quality of teaching is crucial in determining the success of an educational institute. This involves the competence of faculty, their teaching methods, the use of innovative instructional techniques, and the incorporation of relevant and up-to-date content.
- 3. Research and Innovation:** Universities and higher education institutions often engage in research and contribute to the advancement of knowledge in their respective fields. A strong research output, publications, patents, and collaborations with industry can reflect positively on an institute's performance.
- 4. Student Satisfaction:** Student satisfaction is an important indicator of an institute's performance. It reflects how well the institute meets the needs of its students, including factors like facilities, support services, extracurricular activities, and overall student experience.
- 5. Employability:** The ability of the institute to prepare students for the job market is a significant measure of its performance. High employability rates, successful job placements, internships, and strong industry connections are indicative of an institute's effectiveness in this aspect.
- 6. Infrastructure and Facilities:** Adequate and modern infrastructure, including libraries, laboratories, classrooms, and recreational facilities, contributes to a positive learning environment and enhances the overall performance of the institute.
- 7. Graduate Outcomes:** Tracking the achievements of alumni, such as their career progression, advanced studies, and contributions to society, provides insights into how well the institute's education has prepared them for success beyond graduation.

8. **Diversity and Inclusion:** An inclusive and diverse educational environment that welcomes students from various backgrounds and promotes equality can be a significant factor in evaluating an institute's performance.
9. **Accreditation and Rankings:** Accreditation from recognized bodies and favorable rankings within the education sector can indicate a high level of performance and reputation in the educational community.
10. **Community Engagement:** The involvement of the institute in community service, outreach programs, and initiatives that benefit society can reflect positively on its overall performance.
11. **Financial Sustainability:** A well-managed financial structure that allows the institute to invest in its faculty, facilities, and educational resources without compromising quality is an essential aspect of performance.

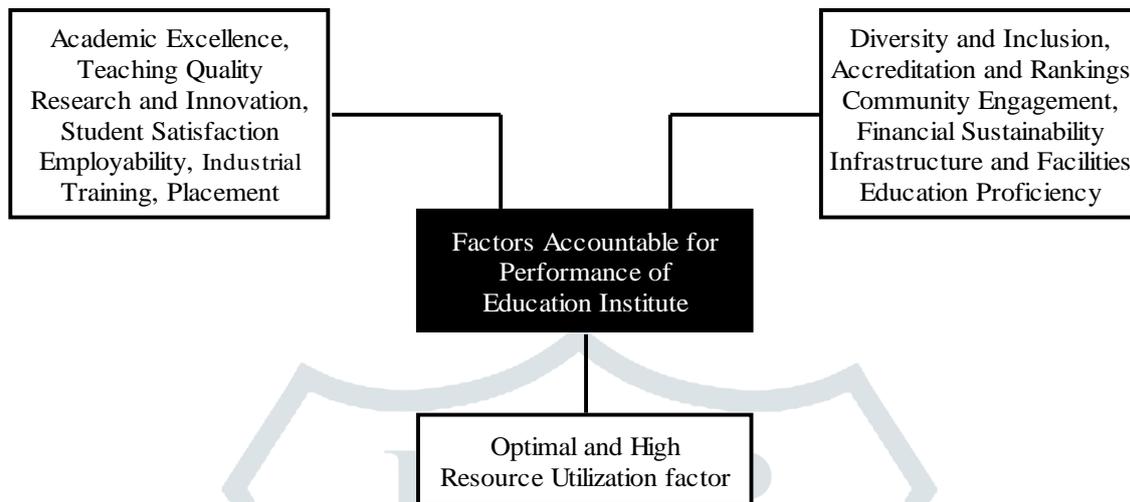


Figure-1. Factors which are accountable for Performance of Educational Institute

The figure 1 clearly indicates that there are numbers of factors upon which the performance education organization depend. The performance can further be enhanced by addressing these factors up to thresholds. One of the most important factors which the organization is needed to take in to consideration is digitalization of the management. The digitalization affects overall utilization factor of the organization which is directly affects the performance of the organization. The utilization factor is a number which indicates that what % capabilities of a specific resource is utilization which is related with the organization. This indicator is used at many places to feel an idea about the performance of organization. Digitalization in management of administration is discussed in the next paragraph.

Educational management using digitalization involves leveraging technology and digital tools to enhance various aspects of educational institutions' administration, teaching, learning, communication, and overall operations. This approach aims to streamline processes, improve efficiency, and provide better learning experiences for students. Digitalization in educational management can lead to increased efficiency, improved communication, better data-driven decision-making, and enhanced learning experiences for students. However, it's important to approach digitalization thoughtfully, ensuring that technology integration aligns with educational goals and the needs of all stakeholders involved. Administrative management, financial management, resources management, resource utilization optimization and transparent responsibility management applications are the core outcome of the implementation of digitalization of management in educational organization or institutions. These are the factors which are directly affected by the digitalization process and ultimately play an important role in performance improvement of the organization. Digitalization has a significant impact on organizational efficiency across various sectors, including education. It involves the integration of digital technologies and processes to streamline operations, enhance communication, automate tasks, and improve overall productivity. Digitalization enhances organizational efficiency in educational institutions by optimizing processes, improving communication, providing data-driven insights, enabling personalized learning, and supporting flexible teaching and learning models. However, successful digitalization requires strategic planning, investment in technology infrastructure, staff training, and a clear alignment of digital initiatives with educational goals.

II. Literature Survey

This section presents a investigative review of few important articles related with the performance of educational organizations and institutes in the prospective of digitalization. Reputed online and offline research journal were considered. Articles from such journals are considered and their outcome is documented in this paragraph of the article with proper references.

Minkowski (2020) believes that it contains values, analytical problem solving and social skills, among others, and Bowie (2022) believes that academic achievement value added is divided into three dimensions: core competencies, citizenship, and professionalism possessed. The study by Cheng (2015) explored the factors influencing the academic achievement of college students using cross-year data on variables such as academic achievement and social engagement, and found that "the higher the level of the student's institution, the more academic achievement is influenced by the student's personal input.

Wu and Li (2021) found that there were inter-school differences in academic achievement among graduating seniors in the "Top of the Class" program, but the differences were not more pronounced with better schools, and factors such as motivation and creativity had a significant positive effect on academic achievement. Fan and Wang (2020) predicted academic achievement and academic risk based on the field of learning analytics, which lies in constructing meaning from data. Li (2021) and other scholars conducted

an empirical analysis of academic achievement of students in general higher education institutions through a survey of a sample of 939 college students, and the results showed that the academic achievement of students in general higher education institutions in general is to be improved, and in terms of gender, the academic achievement of female university students is higher than that of male university students.

Alexander (1935) believes that non-intellectual factors should be valued and have the same effect on learners' academic achievement as intellectual factors. In contrast to this view, Wechsle (1950) argued that non-intellectual factors include both temperament and personality, and focused more on personality factors in between; Li (1997) developed the Non-Intellectual Factors Questionnaire for Primary and Secondary School Students, which the content includes 11 diagnostic measures of nonintellectual factors, such as achievement motivation, interaction motivation, cognitive interest, and motivation to win. The factors of achievement motivation and motivation to win have more influence on students' learning activities than other non-intellectual factors. A review of the relevant literature reveals that scholars' research on the factors influencing academic achievement can generally be divided into two main areas: individual student characteristics and external environmental factors. Studies on students' individual characteristics such as Wang (2000), Zhang (2005) and Wang (2013) argue that students' internal motivation has a significant impact on students' academic achievement.

Zeng (2009) explored the influence of self-efficacy on students' academic achievement based on self-efficacy theory. Wu and Li (2010) found that students' intrinsic motivation, gender and creative tendencies have significant positive effects on academic achievement, and a few scholars have explored the influence of personality on students' academic achievement. Parental involvement, family interaction styles, family cultural capital, and the environment of the community in which they live are also important factors [2]. According to Liu (2018), parenting practices of families are inextricably linked to students' academic achievement. Liu (2018) found that the community environment in which students' families live affects students' academic achievement, that children in rural communities have lower language application skills than those in urban communities, and that the nature of the community significantly and positively influences parental involvement in education and parents' educational expectations. Smart and Toutkoushian (2001) show that the effect on student achievement varies according to the type of school, with schools own doctoral programmers having a greater impact on student achievement than schools with ordinary programs. Pike et al. (2003), based on a model of the relationship between academic achievement, individual student characteristics and the creation of a school level, showed that individual student characteristics had a more significant effect on academic achievement than the school level, such as evaluation, classroom behavior and academic achievement. In her doctoral dissertation, Flynt (2008) scrutinizes the relationship between teacher evaluation, classroom behavior and academic achievement.

III. Research Methodology

The objective of the research is to investigate and analyze the effect of implementation of digitalization in the conduction and management of educational institution in the Indore region. This study was descriptive in nature and it includes surveys, facts and findings. Data was collected using a developed and validated questionnaire. The collected data was analyzed using simple percentage analysis, mean score value and Garrett ranking method. Results are presented in the tabular form and they are interpreted. Quantitative Research Method is adopted in data collection and also in interpretation. 50 Survey Question Paper of each four category were printed and distributed to the respondent of the respective categories which is listed as below:

Table-1. Data sheet for Survey Question Paper distribution and response received

No	Survey Question Paper Title	Target Category	Number of Respondent Selected / Response Received
1	Q-1	Students studying in the Institute	50 No Distribute 40 Response Received
2	Q-2	Faculty members working with Institution	50 No Distribute 40 Response Received
3	Q-3	Staff Members associated with Institution	50 No Distribute 40 Response Received
4	Q-4	Management Committee Members	50 No Distribute 40 Response Received

The respondent were selected randomly, there was no predefined criterion or constrain for respondent selection. Only one aspect was making sure that, the respondent must belongs to the respective category. All respondent are from Indore region and must belong to the education institute. Sufficient time of nearly one week (six working days) had been given to each respondent for their convenience. The survey question paper were get certified by the expert of the subjects.

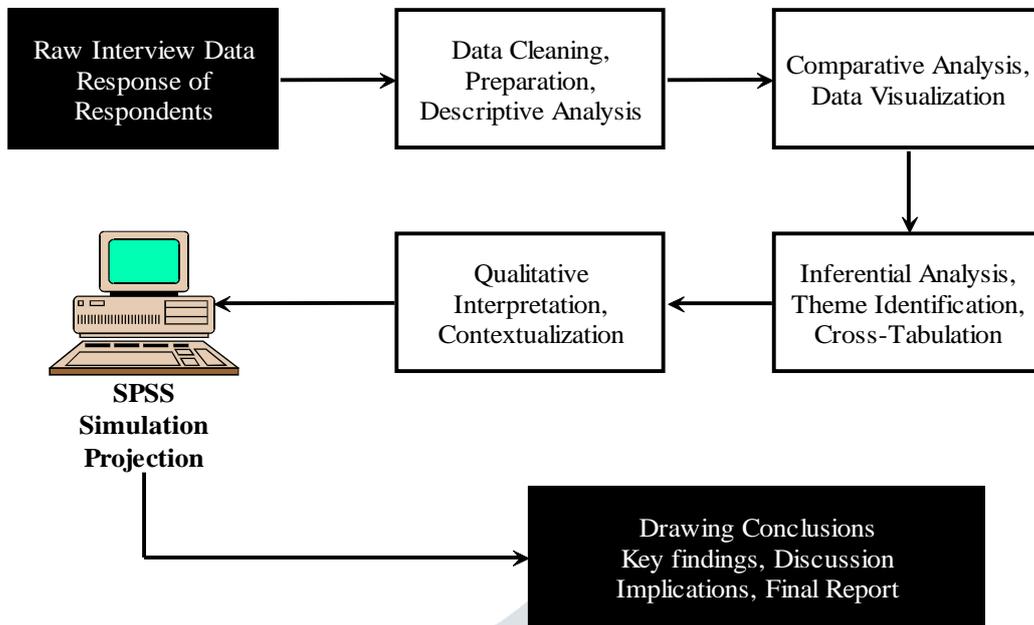


Figure-2. different step followed in the data interpretation

Survey data interpretation involves analyzing and making sense of the information collected from a survey. It's the process of extracting meaningful insights, patterns, and trends from the responses given by survey participants. This interpretation helps researchers, analysts, and decision-makers understand the opinions, behaviors, preferences, and characteristics of the surveyed population. The different step followed in data interpretation is as depicted in figure 2. There are four category of respondent. 50 survey question papers are distributed to each category respondent. A total of 200 survey question papers were distributed. 40 respondents from each category responded timely. A total of 170 participant responded with the time frame. Few responses were discarded due to garbage and irrelevant entries in the response sheet. Finally 160 response sheet were considered for data interpretation, 40 answers from each category.

Table-2. Age Group of Participants (Response Received)

Age Group	Total Numbers	Ratio in Percentage
Below 25	40	25%
26-30	30	19%
31-35	30	19%
36-40	24	15%
41-45	18	11%
46-50	12	07%
Above 50	6	04%
Total	160	

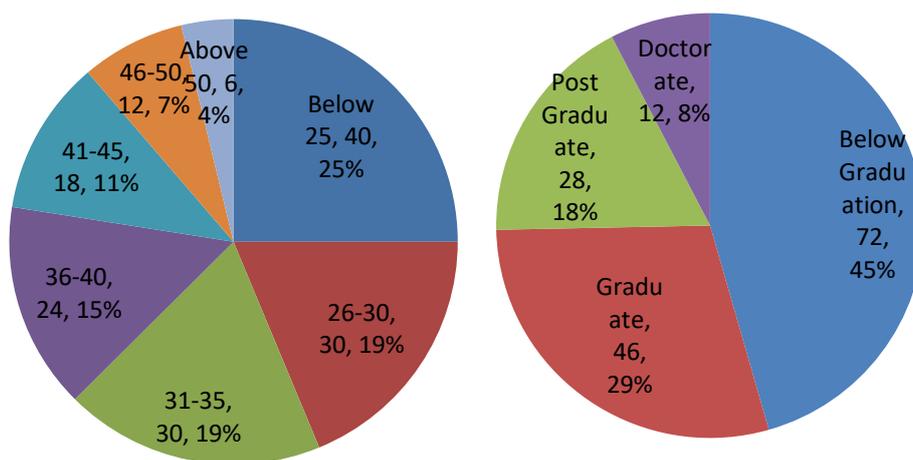


Figure-3. Age Group and Educational Level of Respondent (Accepted) in Percentage

3.1. Statistical Package for the Social Sciences - SPSS

“Statistical Package for the Social Sciences”, which is also commonly known as “SPSS” is basically a complete data integrated, data interpretation and data simulation software which is frequently used at numbers of places in research and data investigation. SPSS Statistics is a statistical software suite developed by IBM for data management, advanced analytics, multivariate analysis, business intelligence, and criminal investigation. SPSS is a widely used program for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and other huge or data engineering in data science. SPSS, which stands for "Statistical Package for the Social Sciences," is a software package developed by IBM for statistical analysis, data management, and data visualization. It was initially created in the late 1960s by Norman H. Nie, C. Hadlai "Tex" Hull, and C. Ray Smith as a tool to aid researchers in analyzing social science data. Over the years, SPSS has evolved into a comprehensive and widely used software platform in various fields, including social sciences, business, healthcare, and more. Most frequently used modules of SPSS in research os as listed below:

SPSS Regression: As the name suggests, this module is specialized in various types of regression analysis, such as linear regression, logistic regression, and nonlinear regression. It also includes tools for assessing model.

SPSS Forecasting: The forecasting module focuses on time series analysis and forecasting techniques. It's used to analyze historical data patterns and make predictions about future values based on those patterns.

SPSS Decision Trees: Decision trees are used for data classification and segmentation. This module helps in constructing decision trees and analyzing the results to understand the relationships between variables.

SPSS Neural Networks: Neural networks are a type of machine learning technique used for pattern recognition and prediction. This module allows users to build and analyze neural network models.

IV. Data Interpretation of Survey Response of Management Individual

This is the most important and sensible data interpretational and data analysis of the presented research investigation. This paragraph visualizes response data in context of management prospective. In total 50 Survey Questionnaire is distributed to individuals belonging to top management position such as director, managers and chairpersons of the educational institutions of Indore region, out of which we receive nearly 40 qualified responses likely to be taken in to account. Interpretation with visualization of data is presented below.

Table-3. Improvement in % as realized by top management position individual under different categories

No	Factor Title and Factor Notation	Improvement in % as realized by the Top Management Position Individual of Institute (Chairman, Director, Managers, HOD)	Percentage of Respondent Expect Further improvement in facility for better efficiency (Chairman, Director, Managers, HOD)
1	Improvement in % after Digitalization in Responsibility Assignment, Monitoring, Accountability & Control (SF_1)	70%	20%
2	Improvement in % after Digitalization in Data Driven Decision Making Process (SF_2)	75%	15%
3	Improvement in % in Dual Direction Communication Between Department and Central Management after Digitalization (SF_3)	65%	25%
4	Improvement in % in Efficient Resource Allocation after Digitalization (SF_4)	80%	10%
5	Improvement in % in Strategic Planning and Forecasting after Digitalization (SF_5)	50%	15%

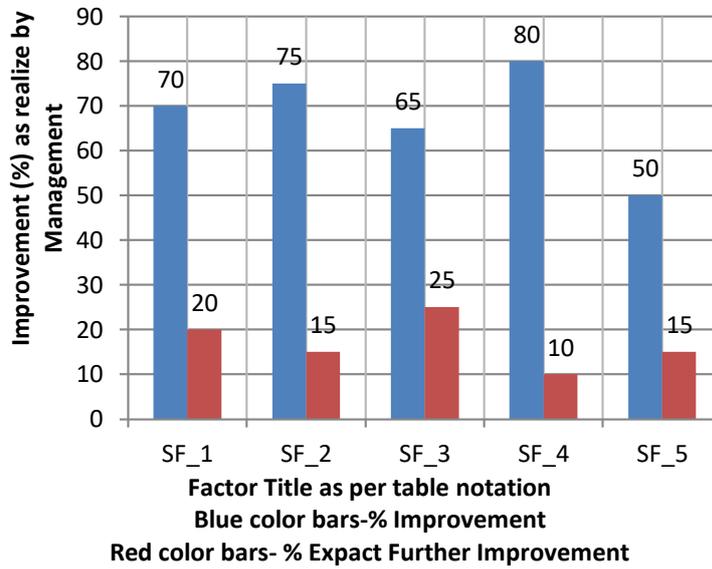


Figure-4. Improvement in % in respective factor as per opinion of Management

Table-4. Improvement in % as realized by top management position individual under different categories

No	Factor Title and Factor Notation	Improvement in % as realized by the Top Management Position Individual of Institute (Chairman, Director, Managers, HOD)	Percentage of Respondent Expect Further improvement in facility for better efficiency (Chairman, Director, Managers, HOD)
1	Improvement in % in Financial Management & Transparence after Digitalization (SF_1)	80%	10%
2	Improvement in % in Education Quality after digitalization (SF_2)	70%	20%
3	Improvement in % in Accreditation, Affiliation and Recognition after digitalization (SF_3)	60%	30%
4	Improvement in % in Student, Parents & Management Relation after digitalization (SF_4)	80%	10%
5	Improvement in % in Industrial Expectation Adaptability after Digitalization (SF_5)	40%	35%

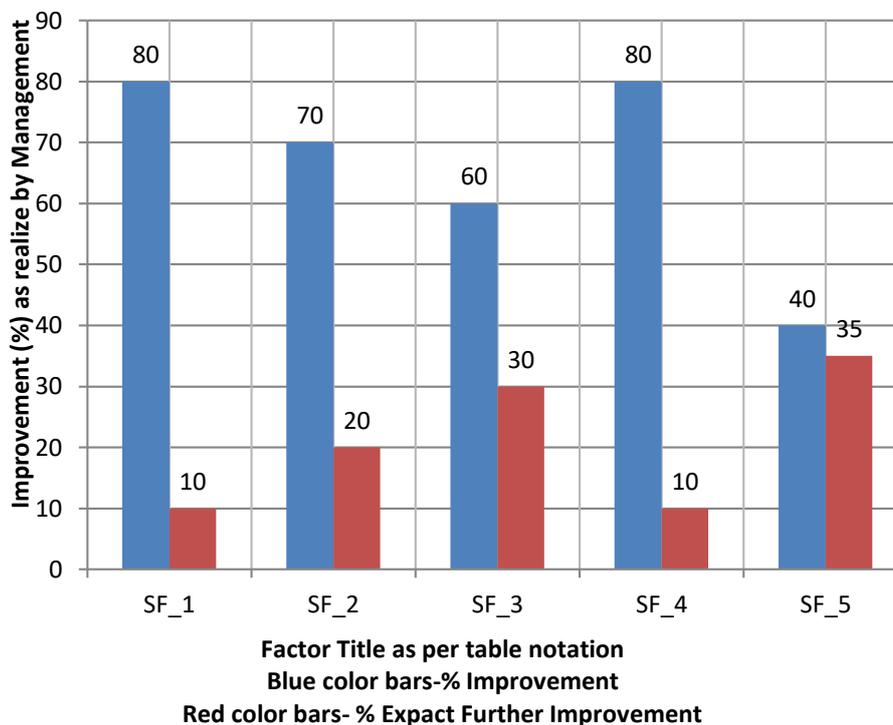


Figure-5. Improvement in % in respective factor as per opinion of Management

From the data interpretation and visualization in SPSS software is crystal clear that the management perception is very positive about the digitalization. Almost every vertical of the management observer significant improvement and efficiency has been improved. Financial Management is observed to be improved up to 80%. Education Quality improvement after digitalization is nearly 70%. Student, Parents & Management Relation after digitalization has improved up to 80% which brings a positive environment in the campus of the institution. Responsibility Assignment, Monitoring, Accountability & Control has become more transparent and improved up to 70%. After Digitalization the Data Driven Decision Making Process is significantly improved up to 75%. Dual Direction Communication between Department and Central Management after Digitalization is observed a improvement up to 65%, this will ultimately makes management more efficient and practical. Resource Allocation and utilization is improved after Digitalization up to 80%. Strategic Planning and Forecasting after Digitalization is enhanced up to 50%, this factor needed to be addresses in a better way.

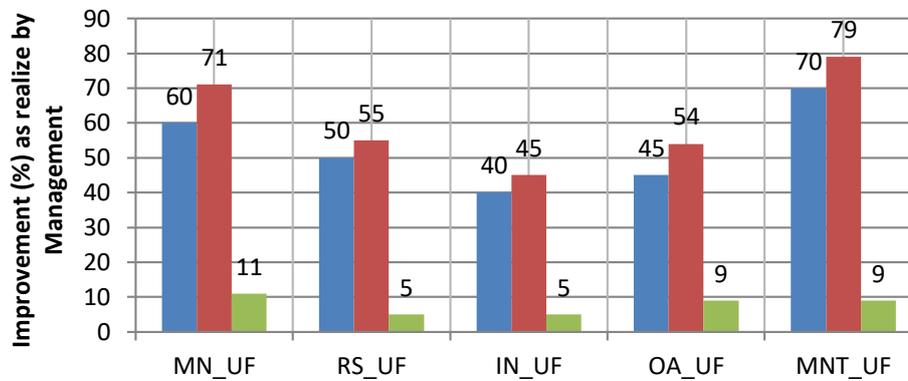
Overall Performance Factor of Educational Institute

The presented discussion and survey data interpretation in the above paragraphs this is very clear that almost every verticals of management process of the educational institute has observed the improvement after the implementation of digitalization of management application in the institute. This improvement will certainly propagate to efficient ad optimal utilization of the different category resources of the educational institution such as Manpower Utilization Factor, Resource Utilization Factor, Infrastructure Utilization Factor and Overall Utilization Factor.

This paragraph discusses and virtually projects the tentative improvement in Manpower Utilization Factor, Resource Utilization Factor, Infrastructure Utilization Factor and Overall Utilization Factor. The table below lists the approximate value of above factor before the digitalization and after the digitalization process. These are the approximate value of different factors, which are projected using the survey data received as response by the management of the institute as discussed in section 6.7. The estimation and projection is using SPSS data simulation software.

Table-5. Factor Value Improvement in % as realized by top management position individual under different

No	Factor Title	Factor Value before Digitalization as projected by SPS	Factor Value after Digitalization as projected by SPSS	Percentage Improvement
1	Manpower Utilization Factor MN_UF	60%	71%	11%
2	Resource Utilization Factor RS_UF	50%	55%	5%
3	Infrastructure Utilization Factor IN_UF	40%	45%	5%
4	Overall Utilization Factor OA_UF	45%	54%	9%
5	Monetization Factor MNT_UF	70%	79%	9%



-----Factor Title as per table notation 6.9-----
 Blue color bars-% Factor Value befor Digitalization
 Red color bars- % Factor Value after Digitalization...

Figure-6. Improvement in % in respective factor as per opinion of Management

V. Conclusion

The presented research article introduces the data analysis and data interpretation concept in the nut shell. Meaning, importance and significance of the same are discussed in the context of the performance analysis and efficiency improvement of the educational institute. An introduction of SPSS software is briefed. First the demography of the participant is tabulated and visualized in the SPSS graph and displayed in the chapter. The present chapter is mainly divided in to four basic sections. Next to this Data Interpretation of survey response of Students studying in the Institute is presented in tabular format which is obtained by the SPSS software. Data Interpretation of survey data of Faculty member associated with Institute is the another section which is addressing the respective topic is presented. Data Interpretation of survey response of staff in the Institute and Data Interpretation of survey response of Management Individual is covered. Finally most important section that is "Overall Performance of Educational Institute" is described and conclusion is declared by the fact that overall performance is significantly improved.

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