SERVITIZATION IN CONSTRUCTION INDUSTRY & ITS EFFECT ON BUSINESS PERFORMANCE

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ABSTRACT
Businesses have only been able to expand in the current market environment by creating new additional services that complement the value of their existing product lines. This pattern is referred to as servitization. Construction companies are changing their business strategies to include services in addition to their usual offerings, which has the effect of making their business projects organized but bit lengthy processes where servitization occurs. Construction companies' business strategies historically focused on giving value through the product. In the civil sector, the user doesn't realize the value until they receive the completed utility, at which point they cut off all communication with the builder. Construction businesses that produce projects are being forced more and more to consider the performance of those projects over their entire lifespan. In order to explore the consequences on perceived project performance, we examine these patterns in relation to the Product-Service literature (often referred to as "servitization"). In order to better understand how organizations might make the shift towards more servitized products and its impact on project performance. We recognize the need to refocus research attention on organizational routines and practices as the unit of study. We believe that routines should be studied as they develop in order to understand how a servitization culture is progressively absorbed into everyday management in construction-based organizations, rather than using servitization as the beginning point for revamping current routines. As a result, the motive of this paper is to create a structure for describing servitization in the construction sector. In particular, we want to understand how servitization impacts Project performance.
Keywords: Project performance, Service Marketing, Servitization

Introduction

Definition of major variables

DEPENDANT VARIABLE: PROJECT PERFORMANCE
The overall evaluation of whether a project has achieved its goals and complied with all schedule, cost, and scope constraints

Figure No.: 1 Definition - Project performance.

INDEPENDENT VARIABLE: SERVITIZATION
Companies in the industrial sector have only been able to expand by creating new services that complement the value of their existing product lines. This style is referred to as Servitization.

Figure No.: 2 Definition – Servitization.

It is becoming more and more obvious that modern businesses are changing in practically every industry and striving to gain the most shareholders in whatever industries they are involved in. This change takes place as businesses move from strategies centered solely on selling items to new strategies based on providing inclusive solutions made up of both products and services. The term "servitization" refers to the process of adding services to traditional offerings in order to create value.

Due to manufacturing's servitization, servitization in construction has become evident. This state is defined by service pro initiatives that lead to long term services based on utility delivery to meet constructor's business objectives. In this form of turnkey project, the goal of the contractors is shifted from the regular delivery of the facility to the provision of continuous facility-related services. This adjustment also makes project performance management more challenging to handle because it adds the operations and maintenance stage to the conventional project management cycle.

According to a number of studies on service-led projects, such projects serve as a model for an integration scheme that connects design, construction, and operations in order to meet builders' demands. Servitization is the provision of long-term operation and maintenance services based on the supply of facilities in the building industry. Large-scale engineering projects with a focus on public-private partnerships make up the majority of service-led projects since they need long-term services from the private sector (PPPs). Yet, some construction companies have started to put the servitization concept into practice since the 2010s without utilizing PPPs.
Moreover, studies have demonstrated that focusing on operational and maintainable services after the facility is delivered may divert attention from problems with the project delivery process. This idea holds that construction services are a set of duties performed by all parties involved in construction to meet the particular requirements of clients. Physical resources like personnel and equipment are required for these jobs. From a value-stream perspective, construction services are divided into; construction services material supply services, design services and other support services.

So, the goal of the current study is to develop a framework for presenting the idea of servitization in terms of how it affects how projects are perceived to perform. There is a wealth of literature that has been written specifically around the concept of servitization and concepts that are closely related to it. It draws attention to the dearth of geography literature in developing economies and demonstrates the potential of nations like India. The causes influencing the construction industry to select servitization as a growth strategy to achieve improved customer interactions and tactics to have greater control over construction project performance have been thoroughly described in the literature.

Review of literature survey

Campos (2021) off-site production is becoming a more popular manufacturing strategy in the building sector. Many tier 1 construction companies have expanded their offerings to include off-site production recently. In a similar vein, this model change is luring fresh competitors to the market. Projects are benefiting from the switch from conventional on-site construction to off-site manufacturing in terms of cost, time efficiency, sustainability, and quality enhancement. The impact of this change in manufacturing processes on the integration of services in business models for companies has not yet been fully understood. The question of whether and how industrialization affects servitization in the building industry was investigated.

Robinson (2016) how changes due to PSS allowed a multinational construction organization to adapt its revised businesses model. The study tracks the progress of one company towards servitization over a 33-month period, showing how the organization was able to capture value in creative ways by mobilizing new resources in the supply chain, generating new products and developing new service offerings. This scenario offers some helpful insights given the paucity of findings on systems integrator and servitization. Systems integrators carefully assess their place within its current value chain as they migrate towards servitized advanced business models and then continuously coordinate internal and external operations as they do so.

Nenonen (2014) servitization is thought of as a possible way for respected goods producers to grow their business, but it also comes with hazards to the brand's reputation. Although suppliers and other external partners are becoming more and more crucial to manufacturing companies' service operations, little is known about how these partners' reputations are affected. The hazards to manufacturing company's reputations from Servitization, particularly when they work with other parties. When choosing a service provider, customers often prioritize a company's reputation, but the performance of third parties during service delivery has a significant impact on this reputation. The argument that third party image concerns are strategic challenges that can influence and guide the PSS process at the levels of strategy, operations, and firm place makes a substantial contribution.

Coreynen (2018) manufacturing enterprises that move into Servitization may run into challenges when scaling up product-service systems (PSS) for future expansion. It has two primary objectives: first, to understand the internal levers that businesses can use to boost their capacity for servitization; second, to implement a new approach to assist businesses in scaling up their PSS. For these reasons, we conduct an exploratory research study of eight manufacturing organisations using the multiple-case and participatory action research methodologies. Designing or implementing PSS might be difficult for manufacturers for a variety of reasons depending on the business strategy. Additionally, they could run across organisational reasoning that hinders efforts to scale up PSS. An instruction to practitioners addressing internal Servitization barriers by offering a new technique for creating specific PSS-improving projects.

Hong (2015) the effects of product-service system (PSS) practices on company performance using survey data collected from the top growing countries. We concentrate on the processes that underlie the association between PSL and company performance. The performance of a corporation in terms of technological innovation of products and processes is favorably correlated with its use of PSS. Rather than through product technological innovation, PSS affects organizational performance through process technological advancement. To effectively harness the power of PSS, businesses should concentrate their efforts on creating a new business process or business system.

Gebauer (2019) servitization procedures and servitization in the wind to energy sector in West regions, a frame for territorial Servitization has been developed. The tabular components can be included into regional development theories, and it is compatible with ideas of knowledge intensive business services (KIBS) and industrial life-cycles (e.g., lead market models, sustainability transitions, and territorial innovation models). Servitization processes help regions by creating job opportunities, enabling effective technology resource allocation, giving new markets, boosting territorial advancement, boosting chances of ensuring employment during the consolidation period, and assuring technological advances.

Robinson (2016) the UK construction industry's Construct Co., a systems amalgamation of mechanical & electrical systems, is utilized to investigate how product technology advancement influences more environmentally friendly ways of working. They are looking for ways to use servitization to increase the overall performance systems. The aim was to comprehend why and how variable user groups within the company's value chain were able to operate in better servitized ways as a result of emergent technology characteristics that were sparked by the incorporation of new sensors into the systems. The establishment of increased transparency between Build Co. and its clients depended on new energy-metering sensors. There were also signs of upkeep. It was also clear how equipment-condition monitoring sensors were influencing the supply chain of Build Co. in numerous ways to look into the case for introducing predictive maintenance.

Dachs (2014) a growing number of manufacturing enterprises produce and offer services in addition to or in instead of their conventional physical products. With the help of case studies, a sizable firm-level data set, and new evidence for the Servitization of European manufacturing, the research tests earlier conclusions. In contrast to the turnover of their physical products, manufacturing companies' service turnover is still modest. The level of Servitization can only in part be explained by differences in national cultures. More significant is the company's size. There is a U-shaped link between firm size and servitization, proving that both small and large businesses can profit from this process. Servitization is also linked to product complexity and a company's propensity to introduce innovative products.

Ruizalba (2016) throughout the past few decades, the pharmaceutical distribution industry has changed, as has the function of servitization in a constantly shifting market controlled by big businesses. A thorough list of the services now provided by the sector was identified by an empirical investigation of distributors in Portuguese and Spanish. These companies were contrasted in terms of their current service delivery, the extent to which added-value services were implemented, the primary drivers behind such implementation, and the degree of sector cooperation. There are some disparities between the two nations in terms of the extent and causes of value-added service deployment. The issue is distributors' propensity to broaden their core service offerings in the future in an effort to obtain a competitive edge and boost client loyalty. As a "back to basics" strategy with little differentiation, this raises questions because it could not be consistent with long-term competitiveness.

Bustinza (2015) the term "servitization" refers to a change in the organizational structure of a firm from selling items to selling a combined offering of commodities and services. An advantage in the marketplace is one effect of this change. Businesses go through phases as they develop services to set themselves apart from products and increase consumer satisfaction. Using the findings of 102 senior executives from international corporations, this study evaluates the change from basic to intermediate to advanced services. It demonstrates the growing interest

in service-led strategies among manufacturing companies. It also demonstrates how important greater distinctiveness and good customer satisfaction are to gaining a competitive edge and providing better service. The value of a company's position in the value chain and the organizational design it selects to support services in effective servitization.

Objective of study

To study the impact of drivers of Servitization on project performance.

Hypothesis

1.Servitized offerings by Construction firms significantly influence Project Performance.

Figure No.: 3 Model Framework.

Research Methodology

Design of the Study

We propose a structure to support servitized business models for companies in the construction industry based on the pertinent existing literature. The significance of the suggested Servitised model is then evaluated using a number of variables that gauge the importance of services in the growth of the company. Servitized offerings to be studied as a part of each process included in completion of construction activity.

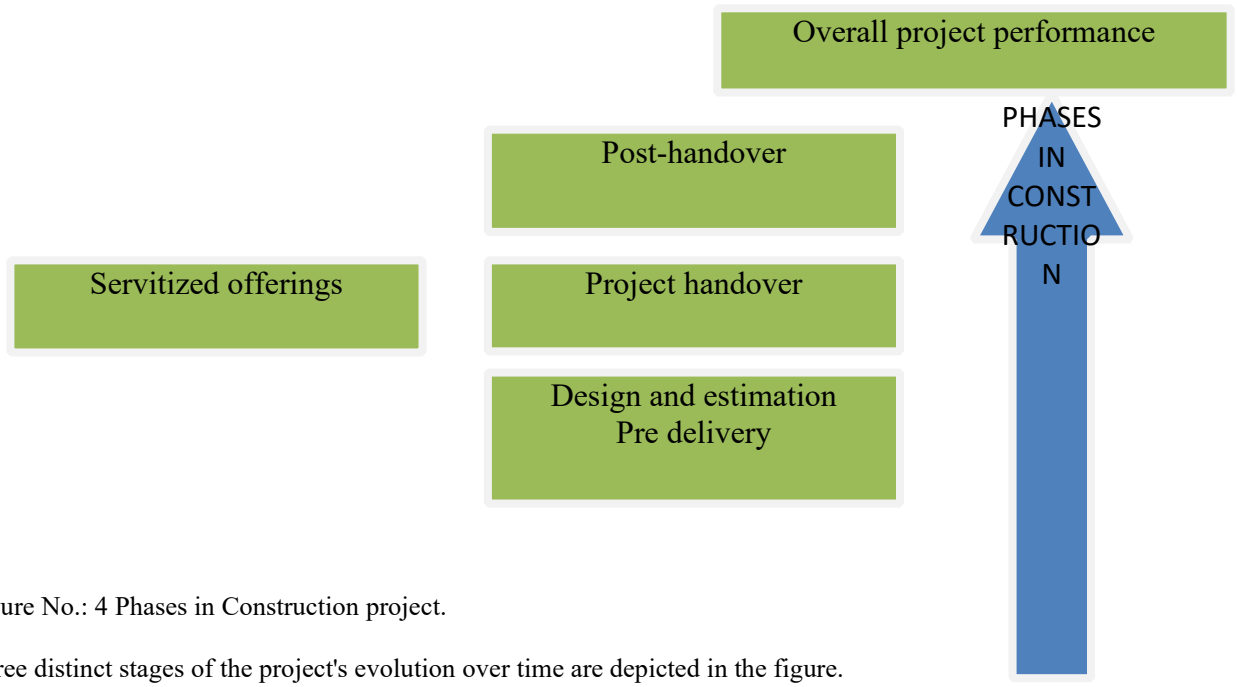

Figure No.: 4 Phases in Construction project.

Three distinct stages of the project's evolution over time are depicted in the figure.

It is crucial to remember that creating business models based on services for the civil turnkey project sector necessitates giving up the notion that value only exists during the project-delivery phase. The project should be viewed as a process with stages that come before and after the actual building or utility construction and delivery to the client. In order to make sure that the client sees value in each phase, it should figure out how to add services to each of these stages. So, a project-supplying company should carefully consider what services to incorporate during the various stages of the lifespan of the solution it offers.

Pre delivery phase:

This is the initial phase, during which the project's technical, commercial, and economic viability are developed as services. A thorough technical and economic analysis of the project will be crucial to its success. Because it will make it possible to define goals that are more achievable and give a better indication of how an investment will behave. We suggest that the planning and structural risk analysis services be included in this first step, which will also help to define more exact timelines.

Project handover phase:
In this phase, the project's core development activities—material procurement, construction, installation, and other services that are added to the construction process itself, including the creation of reports on the progress of the work and costs incurred during execution—are all included. The project's delivery to the client marks the conclusion of this phase.

Post-handover phase:
Currently, civil-based businesses should have a tendency to continue providing services after project handover. So, all services that may be offered to the client once the building is delivered are included in the handover phase. Evaluation, operation, and maintenance services will be particularly crucial since they give the business an incoming flow of cash that will fluctuate less and be more stable over time. The same services will also make it possible to gather fundamental information about how the building operates. Following analysis of this data will provide the company with knowledge and information that directly affects the design stage.

Research design, Sample frame and Size

- Proposed territory to carry out this study is limited across Pune city only.
- In spite of the base location of the organization (Viz. in Maharashtra/outside Maharashtra), research is proposed to be kept for Residential project sites with territorial location within Pune only.
- With the help of a sample study attempting to generalize for the target population, Survey Research Method is most advisable and used.
- Unit of analysis is Individual – Firms representatives [MD's, Directors, owner, proprietor, Head Marketing]
- Study used convenient samples to collect the data.
- Except demographic and organizational profile, rest of the constructs are measured by borrowing the standard scale from the literature and most of scales are measured in 5 point rating scale, all the data are perceptual, there is no absolute data to measure the performance of the firm.

Data Analysis Plan

- Basic Summary statistics – Item, Dimension and construct wise [Mean, SD, Min and Max]
- To assess the reliability – Cronbach alpha is computed dimension wise
- To Explore the relationship among the study constructs Exploratory factor analysis is used [no hypotheses tested]
- To prove the basic model, Structural Equation model is applied [Hypothesis tested]

Sampling frame

Sr. No	Type of respondents	Count
1	Construction Firms	51

Table No.: 1 sampling frame.

Demographic Distribution

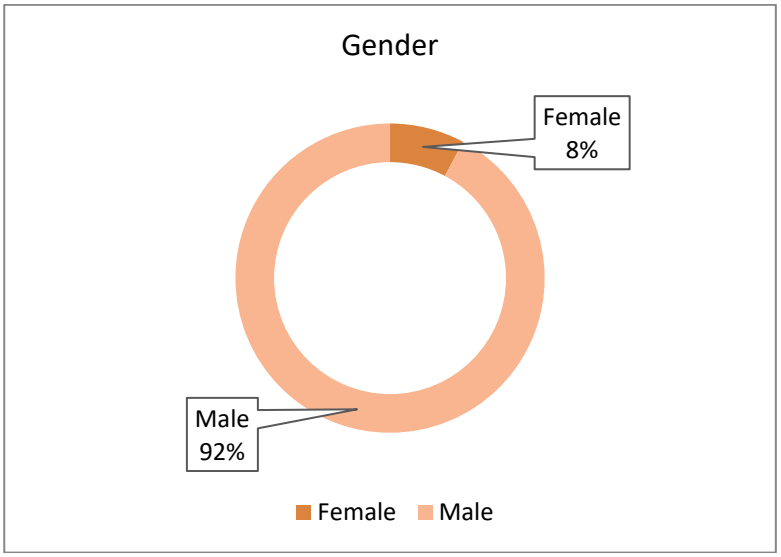

Figure No.: 5 Gender Distribution.

According to the examination of the aforementioned table with regard to gender, male respondents scored 92.16%, the maximum possible, while female respondents scored 7.84%, the lowest possible.

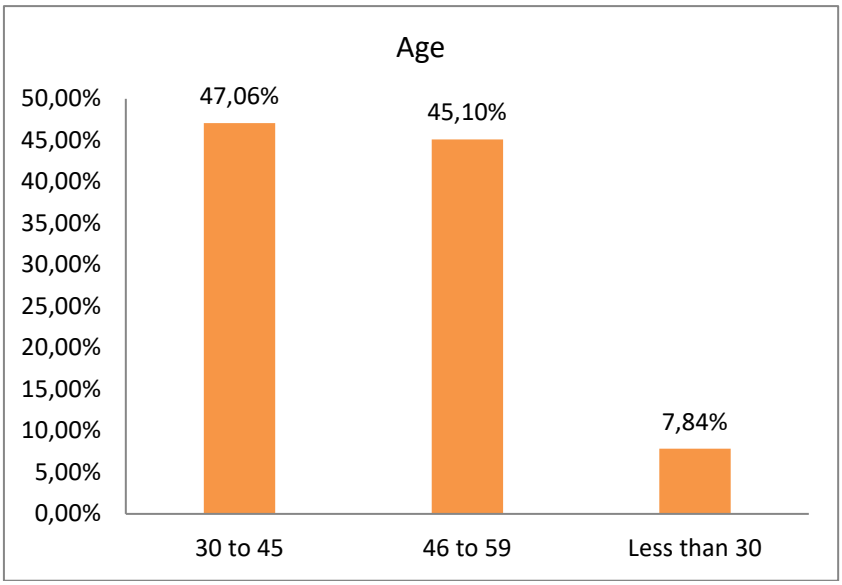

Figure No.: 6 Age.

According to the analysis of the aforementioned table with respect to age, respondents aged 30 to 45 received the maximum score of 47.06%, those aged 46 to 59 received the score of 45.10%, and respondents aged less than 30 had the lowest score of 7.84%.

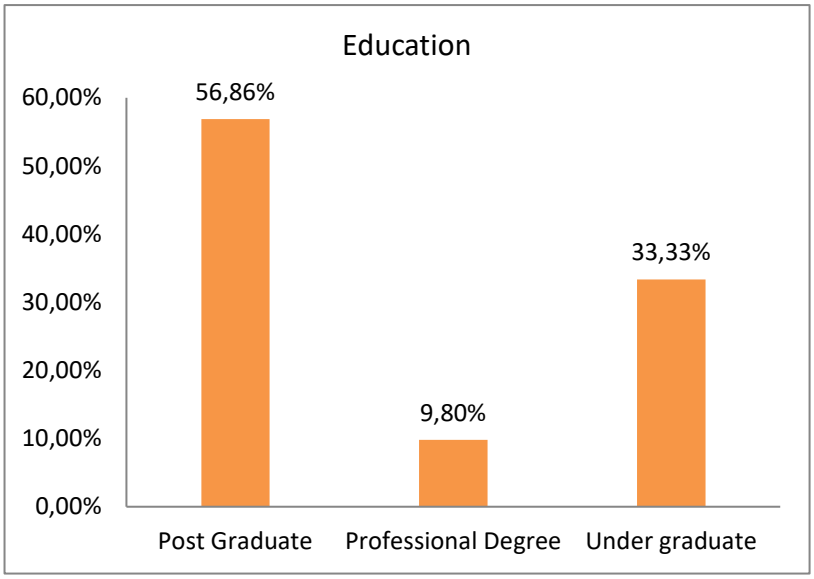

Figure No.: 7 Education.

According to the study of the above table with regard to education, respondents with postgraduate degrees scored the highest 56.86% while respondents with undergraduate degrees scored the lowest 9.80%.

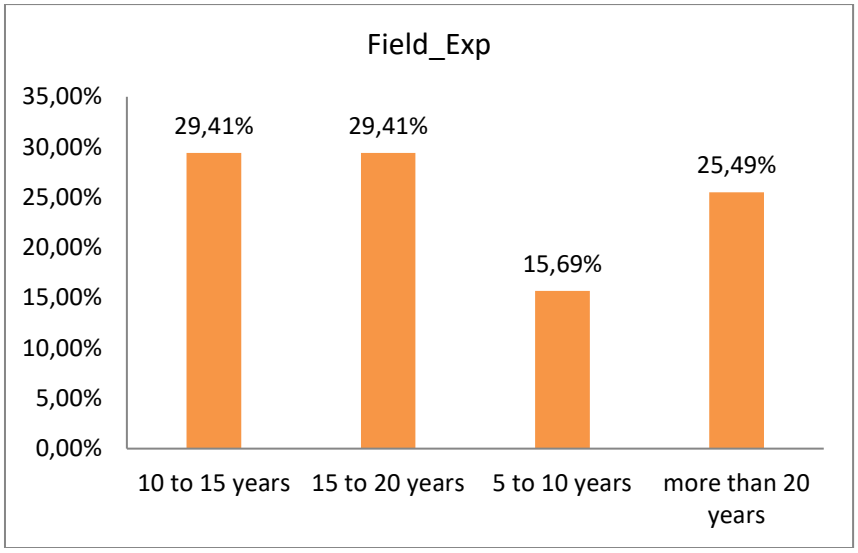

Figure No.: 8 Field Experience.

On the analysis of the above table with refer to Field Experience, 10 to 15 years & 15 to 20 years respondents achieved the highest & similar score of 29.41%, more than 20 years respondents achieved the score of 25.49% while 5 to 10 years respondents achieved the lowest score of 15.69%.

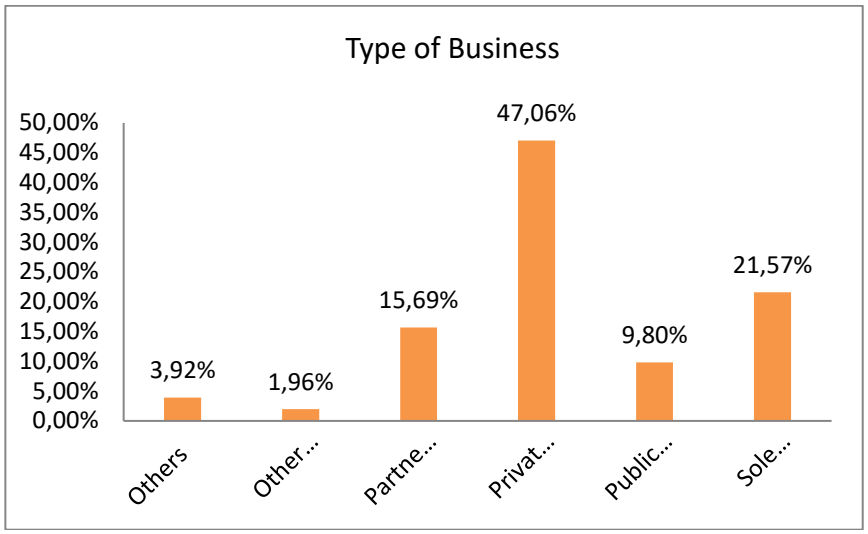

Figure No.:9 Type of Business.

On the analysis of the above table with refer to type of Business, Private Ltd Company achieved the highest score of 47.06%, Sole proprietorship achieved the score of 21.57%, Partnership achieved the score of 15.69%, Public Ltd Company achieved the score of 9.80%, Others achieved the score of 3.92% while Others, please specify achieved the lowest score of 1.96%.

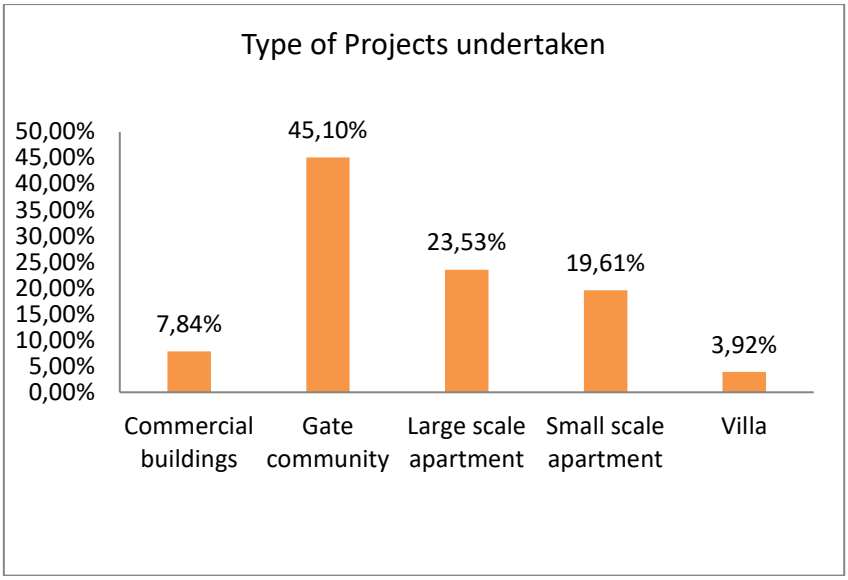

Figure No.: 10 Type of Project Undertaken.

On the analysis of the above table with refer to type of projects, Gate community achieved the highest score of 45.10%, large scale apartment achieved the score of 23.53%, Small scale apartment achieved the score of 19.61%, Commercial buildings achieved the score of 7.84%, while Villa achieved the lowest score of 3.92%.

	vars	mean	sd	min	max
DR01	1	4.22	0.50	3	5
DR02	2	4.61	0.57	3	5
DR03	3	4.20	0.89	2	5
DR04	4	4.43	0.57	3	5
DR05	5	4.24	0.74	2	5
DR06	6	4.37	0.75	2	5
DR07	7	4.36	0.56	3	5
DR08	8	4.44	0.58	3	5
DR09	9	4.31	0.76	2	5
DR10	10	4.51	0.54	3	5
DR11	11	4.29	0.61	2	5
DR12	12	4.41	0.67	2	5
DR13	13	4.39	0.53	3	5
DR14	14	4.47	0.61	3	5
DR15	15	4.27	0.72	2	5
DR16	16	4.41	0.73	2	5
DR17	17	4.35	0.48	4	5

Table No. 2 Drivers of Servitization - Basic Analysis

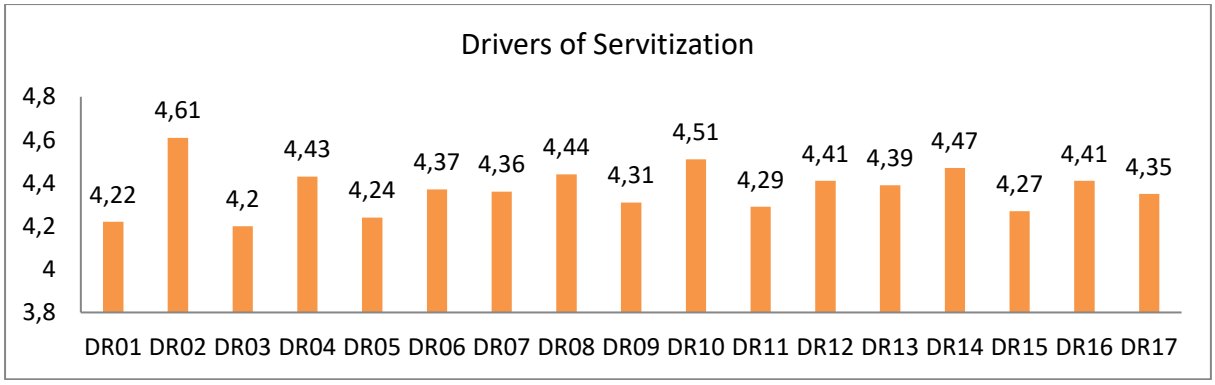

Figure No.: 11 Drivers of Servitization- Mean Bar Chart.

DR02 received the greatest mean score of 4.61, followed by DR01 with a mean of 4.22, DR04, DR09, DR14, DR17 with mean scores of 4.43, 4.31, 4.47, and 4.35, respectively, and DR03 with a mean of 4.20. DR03 received the lowest mean score of 4.20. Standard deviation ranged from 0.48 to 0.89 for all of the above constructs.

	vars	mean	sd	min	max
PP01	31	4.25	0.69	2	5
PP02	32	4.43	0.57	3	5
PP03	33	4.45	0.61	3	5
PP04	34	3.49	1.41	1	5
PP05	35	4.78	0.46	3	5

Table No.: 3 Project Performance - Basic Analysis

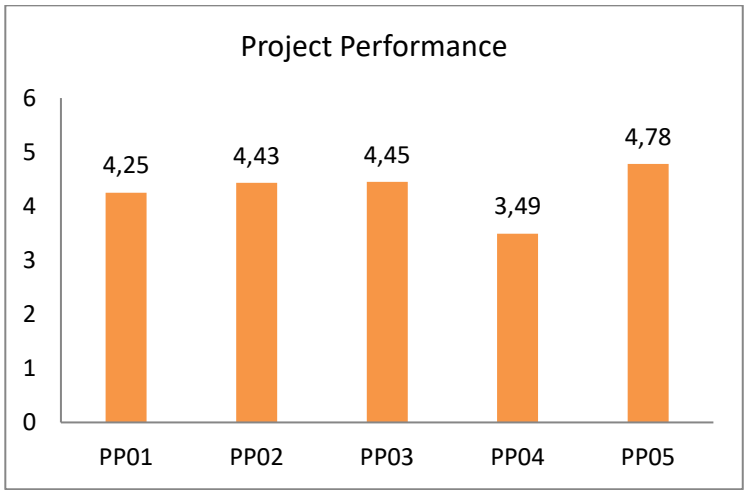

Figure No.: 12 Project Performance - Mean Bar Chart.

According to an examination of the aforementioned table involving Project Performance, PP05 received the highest mean score of 4.78, followed by PP01 with a score of 4.25, PP02 with a score of 4.43, PP03 with a score of 4.45, and PP04 with a score of 3.49. Standard deviation ranged from 0.46 to 1.41 for all of the above constructs.

Constructs Name	Cronbach Alpha	Mean	Std	No of items
DRI: Drivers	0.718	4.369	0.278	17
PRJ: P Perf	0.699	4.359	0.366	8

Table No.: 4 Reliability test and Descriptive Tests.

A reliability coefficient is alpha. It is frequently used to assess a psychometric test's internal consistency or reliability. The Cronbach alpha for the majority of the constructions is greater than 0.5, according to a review of the aforementioned table.

This aims to understand the influence of drivers on project management. Drivers are the independent variable, project performance is the dependent variable and market orientation is the mediating variable in the present study. The relationships between these variables were hypothesized and the role of these variables in influencing the outcome variables was statistically tested and analyzed.

To test the proposed hypothesis, Partial least square structural equation modeling (PLS-SEM) was used. Partial least square structural equation modeling (PLS-SEM) is a new generation of statistical software that is user friendly and uses the least square method to calculate structural equation modeling rather than the covariance-based method. Ordinary Least Squares (OLS) Regression was used as the estimation method. PLS SEM included two models: the outer model, also known as the measurement model, and the inner model, also known as the structural model. The outer model was validated using the measurement items' outer loadings and path coefficients. The constructs in the study were tested for reliability and validity. The construct reliability was determined using Cronbach's alpha, composite reliability, and AVE. The measurements' validity was determined using discriminant validity. The proposed model was also tested using R square values. The path coefficients' significant values were used to assess the significance of the relationship between the variables under consideration. The section that follows goes into detail about the measurement model and structural model.

	R Square	R Square Adjusted
Project Performance	0.364	0.364

Table No.: 5 Table Representing R Square Values

Testing of hypothesis using t values and p values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Drivers - Project Performance	0.414	0.437	0.131	1.42	0.031

Table No.: 6 Bootstraps results.

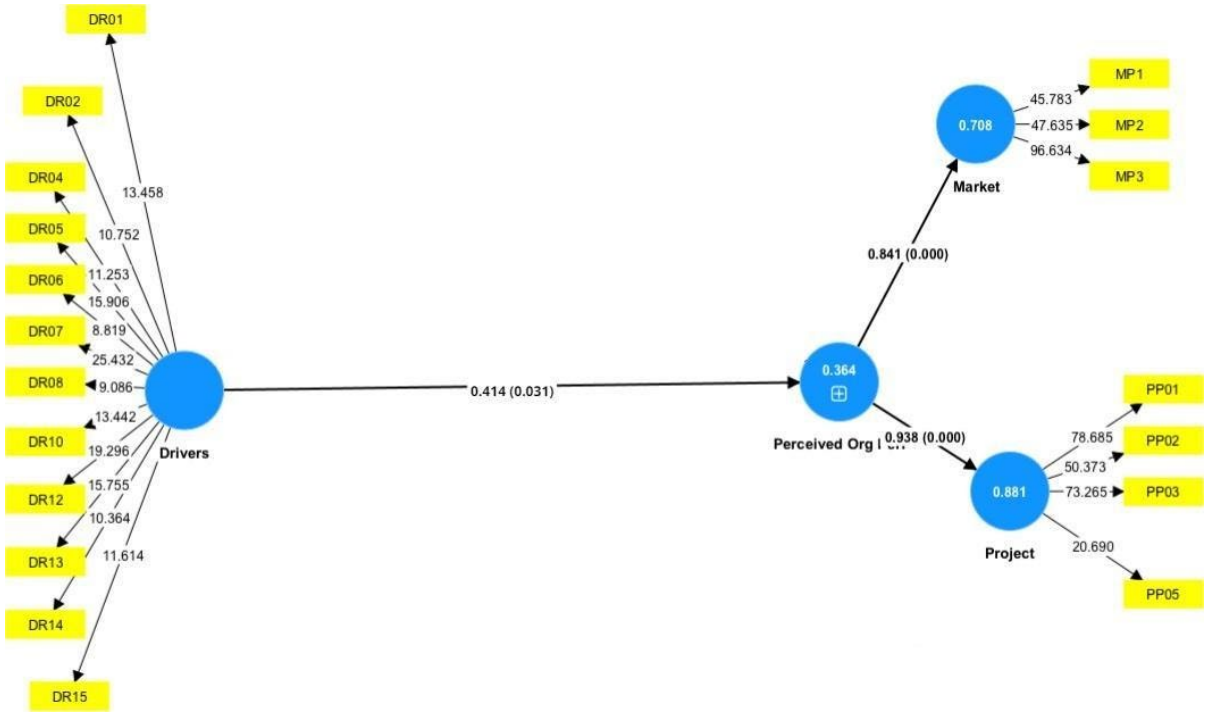

Figure No.:13 Bootstraps results- SEM Loading diagram.
Source: prepared using SPSS statistics by IBM

Finding and Conclusion

Hypothesis was proposed to understand the significant influence of drivers on project performance. To test this hypothesis, the p values and t value statistics were considered. If the p value was found to be less than 0.05, then the relationship was considered to be significant. From the above table we can understand that the t value was found to be 1.422 and the p value was found to be .031. From this we can understand that the null hypothesis was rejected. This tells that there is moderate relationship exists of drivers on project performance. Thus having a glance on total study it can be concluded that Servitized offerings by Construction firms significantly influence Project Performance.

Reason for moderate relation amongst Variables

To understand the variables influencing Project performance other than drivers of Servitization, an unstructured open ended interviews for builders especially owners of organization were carried out.To back up the study and to provide valid scope of future study, an unstructured interview were taken from 25 Number of builders who were amongst the respondents of total study.

Following Question were asked with the room of spontaneity to evaluate remaining constructs which affect perceived project performance other than Servitized market offerings.

1. Do you think improvement in service marketing capabilities can solely influence perceived project performance?
2. What all are the factors you practise to enhance the project performance of the firm?
3. Can service marketing capabilities influence project and market performance of an organization both?
4. Do you think product service literature enhances market performance for revenue generation?

On the basis of unstructured interview, a word cloud has been prepared to understand the major constructs which affects project performance other than servitized market offerings.

Figure No.: 14 Word Cloud - Unstructured interview.
Source: Prepared using www.freewordcloudgenerator.com.

Final Conclusion

Servitization enhances perceived organization performance due to.

- Improves business values in terms of market position.
- Improved responsiveness towards customers.
- Enhanced communication with customers.
- Timely handover of projects.
- Cost firmness till completion.
- Ecological and environmental assessment.
- Effective communication within department

Variables enhance perceived organization performance other than Service marketing capabilities**.**

- Adoption of latest technologies in construction industry.
- Planning & management through PMS (project management software).
- Financial management while using advance technology.
- Trained force from ground laborers to top management.
- Preventive maintenance of machineries.
- Training and skill development programme.

- Workmen safety practices.
- Government policies and developments etc.
- Lending rates by institutions, NBFC's & Banks. & many more.

Overall, the report will express the research by introducing existing literature and highlighting key findings, empirical evidence of impacts, and challenges of incorporating servitization in the Builder industry. The literature serves as the foundation for research questions, and methodology will be used to address issues that arise as a result of the integration of advanced service marketing models within Builder firms. The results and findings are revealed, along with a clear description of the responses of the many real estate companies from Pune that participated. The result will help builders to serve customers with added servitized business models to reach up to new streams of revenue, Customer retention and satisfaction.

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