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Success Mantra for Construction Program Management

Clear Service Development Strategies – Innovation & Service Envisioning

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CONTENTS

ABSTRACT

The Challenge:

As is well known, most construction projects are very complex, have numerous inter-dependent activities, involve heavy investments, require high level of technology and need effective management of large resource pools. The complexity and dynamic structure imposes numerous financial, legal, ethical, safety, environmental, and logistic constraints.

Indian construction industry has not been very successful in completed projects delivering the intended strategic benefits.

A typical construction initiative happens in phases:

- Concept including feasibility study
- Planning & Development
- Detailed design
- Construction
- Start-up & Turnover to owner

Each phase is typically managed as a project. Although component projects invariably operate in 'silos', the deliverables from these component projects are required to be integrated efficiently to deliver the benefits envisaged. Inability to effectively deal with integration challenges and project interdependencies, leads to poor project performance in many cases. This results in stakeholder dissatisfaction and low level of project success.

Innovative service envisioning:

The paper discusses a ***success mantra for construction program management*** which details a framework to drive efficiency and consistency among component projects and deliver program objectives with higher probability of success. This solution framework is derived from PMI® Standard for Program Management® [1]. A construction initiative can be effectively managed as a strategic program having a number of related projects, each having deliverables that produce outcomes resulting in benefits realization and stakeholder satisfaction. Suitable governance structure to address the dynamics of business environment, risks and scope changes, to ensure the program remains aligned with strategic objectives; is an important facet of this framework.

INTRODUCTION

Management Techniques in Construction Industry

India's construction industry is the second largest employer and contributor to economic activity after agriculture sector. Construction activities contribute about 9-10 % of GDP. The construction sector [7] 8] employs more than 35 million people and is valued at about USD 350 Billion. 65% of the demand for construction activity in India comes from the infrastructure sector; the rest predominantly comes from real estate sector.

The Indian construction industry has not kept pace with some of the other industries, in their adherence to professional management frameworks. It lags behind some of the other industries in its implementation of modern management techniques such as those contained in the Standard for Program Management® by the Project Management Institute (PMI®) [1]. As a result the construction industry has not been very successful in completed projects delivering the intended strategic benefits. The projects are typically challenged by cost, quality and time overruns and in many cases not meeting stakeholder expectations.

The paper discusses:

1) Uniqueness of construction programs
2) Construction Industry segmentation
3) Performance shortfalls through a case study of about 1000 projects in infrastructure sector valued at about Rs. 14 Lakh Crores
4) Challenges faced including the non construction challenges
5) New management approach for enhancing probability of success
    a. Project focus Vs Program focus
    b. Management techniques
6) Mantra for success in construction program management
7) Benefits to stakeholders

DETAILS OF THE PAPER

Construction Management

Construction Management encompasses the overall planning, coordination, and control of a project from beginning to completion. Construction Management is aimed at meeting a client's requirement in order to produce a functionally and a financially viable project. Construction projects involve a diverse set of stakeholders that includes Owners/Developers, Architects, Design & Engineering Professionals, Specialist Consultants, Investors/Financial Institutions, Government Bodies, Corporates, Project & Property Management Consultants, Builders, Suppliers and Contractors.

Standards in Use

CMAA Standard. Construction Management Standards of Practice[4] states that the most common responsibilities of a Construction Manager fall into the following seven categories: Project Management Planning, Cost Management, Time Management, Quality Management, Contract Administration, Safety Management, and Construction Management Professional Practice. The Construction Management professional practice includes specific activities, such as defining the responsibilities and management structure of the project management team, organizing and leading by implementing project controls, defining roles and responsibilities, developing communication protocols, and identifying elements of project design and construction likely to give rise to disputes and claims.

PMI Standards. Project Management Body of Knowledge®, PMBOK® [2] from PMI® covers all of the above knowledge areas and additionally covers other areas that have found favour from general industry best practices inclusive of stakeholder management. The Construction Extension to PMBOK® [3] has adapted the nuances of construction projects and included aspects relevant to management of safety, finance, claims and the environment. The Construction Extension [3] together with PMBOK [2] is a good source of best practices that are helpful in managing projects and has been acknowledged as such by practitioners in the construction industry. The Standard for Program Management® by the Project Management Institute (PMI®) is a very comprehensive management resource for construction programs management.

Phases in a construction project

A typical construction project development happens in following phases:

1) Concept including feasibility study
2) Planning & Development – basic drawings baselined, project criteria established, schedule & cost developed.
3) Detailed design with good for execution (GFE) drawings.

4) Construction
5) Start-up / Commissioning & Turnover to owner

Uniqueness of construction initiatives

Construction projects are unique in many ways and hence increased execution challenges come to bear on project success. Some of the unique attributes and facets of construction projects that impinge on project success are:

a) Inherently contain a high degree of risk in the projections of cost and time and each project is unique.
b) When constructed on different sites, each project presents its own challenges to accurate cost, time projections and control
c) Construction projects in industrial sector often require unique interfaces and integration challenges that demand construction techniques to be varied to suit nuances of technology transfer which can lead to sub contracting challenges, schedule extensions and cost escalations.
d) Construction projects must address geography, site conditions and relation of project to the environment
e) One-off, rather than mass produced products.
f) No opportunity for prototype, but phased construction can provide opportunity to refine project design based on experience of initial phase
g) Too many stakeholders in construction projects. Most other projects do not have such a large diverse set of stakeholders
h) Construction projects require large amounts of money, materials, equipment, tools and specialist skills & labour

Construction Industry Segmentation

For purpose of this paper, the two segments of the construction industry [7] [8] [9] – infrastructure and real estate; serve to model the representative range of project activities and challenges encountered in the management of construction projects. There is public and private participation (PPP) within the two segments. They are delineated as follows:

Infrastructure sector

- comprises the central (government) developmental works; viz. Power, Roads, Coal, Steel, Railways, Telecommunications, Ports, Fertilizers, Cement, Petroleum & Natural Gas and Civil Aviation.

Real estate sector

- comprises the four major sub sectors - housing, retail, hospitality, and commercial. The growth of this sector is well complemented by the growth of the corporate environment and the demand for office space as well as urban and semi-urban housing.

In recent years with increased use of MIS, some modest attempts have been made by centre (Government of India) funded infrastructure projects to capture the basic project parameters and record in repositories for progress tracking, performance monitoring and to serve as a knowledge base.

The real estate segment does not have any such consolidation of projects data and no central source of credible data has yet emerged. However by transposing data from multiple sources, [11] [12] [13] extrapolating from resources consumed in projects implementation, share of PPP projects and such other dispersed correlations, it has been possible to arrive at an indicative value for projects under execution in the real estate sector. These figures have been used in this paper to arrive at the size of construction industry and its segmentation.

Salient details on the construction industry segmentation are enumerated below:

Attribute	Infrastructure projects	Real Estate projects	Remarks
Sectors covered	Roads, Power, Coal, Steel, Railways, Telecommunications, Ports, Fertilizers, Cement, Petroleum & Natural Gas and Civil Aviation. Also Urban infrastructure.	Housing, Retail, Hospitality, and Commercial.	Industrial activities enabling manufacturing facilities covered under real estate category.
Project Sponsor / Owner	GOI, Ministry / Central public sector	Private sector / developers	PPP projects included under infrastructure projects
Value of projects	220 B $	130 B $	Approximate figure. Good assumption for identification of best practices and success factors.
Segment Percentage	65 %	35 %	
Project progress	Planned, tracked and controlled on triple constraints of cost, schedule and scope.		Objective based project success criteria not applied in most cases.
% of GDP	9-10 %		
Employment in industry	35 Million		85% Unskilled Labour; 10% Skilled; Engineers, Technicians, Foremen 5 %

Table 1

Infrastructure Projects Performance Data

The Infrastructure and Project Monitoring Division (IPMD) under the Ministry of Statistics and Programme Implementation (MoSPI) monitors the implementation status of all central sector infrastructure projects costing

more than Rs.150 crore. Projects are managed by the respective administrative ministry and their central sector public enterprises through individual project management structures.

Implementation Status of Infrastructure Projects [6]

As on 01.03.2016, 1071 projects with anticipated completion cost of Rs. 14,26,985.93 crore were on the monitor of IPMD. For the purpose of monitoring, these projects have been grouped into two categories:

As on 1st March 2016

S.No.	Category	No. of projects	Anticipated Cost (Rs. In crore)
1.	Mega (Rs. 1000 crore and above)	280	10,84,109.21
2.	Major (Rs. 150 crore to less than Rs. 1000 crore)	791	3,42,876.72
	TOTAL	**1071**	**14,26,985.93**

Table 2

The key financial parameters of the monitored projects have been highlighted in the following tables.

Sector-Wise analysis of Cost Overrun in projects [6] **All Costs in Rs. Crore**

Sector	Total Projects	Cost Original	Cost Anticipated	Cost Overruns w.r.t Original
ATOMIC ENERGY	4	40,442.00	51,918.00	11,476.00
CIVIL AVIATION	4	1,177.28	1,186.17	8.89
COAL	88	60,408.62	61,521.55	1,112.93
FERTILISERS	1	197.79	209.44	11.65
MINES	3	2,555.63	2,555.63	0.00
STEEL	34	54,044.86	54,574.30	529.44
PETROCHEMICALS	1	5,460.61	9,965.00	4,504.39
PETROLEUM	66	137,131.44	145,764.07	8,632.63
POWER	111	304,580.02	353,192.66	48,612.64
HEAVY INDUSTRY	1	1,718.00	3,827.30	2,109.30
HEALTH & FAMILY WELFARE	9	2,563.15	2,563.15	0.00
RAILWAYS	298	254,176.67	329,512.54	75,335.87
ROAD TRANSPORT AND HIGHWAYS	411	248,173.44	250,520.01	2,346.57

SHIPPING AND PORTS	8	4,117.75	5,048.81	931.06
TELECOMMUNICATIONS	2	15,445.17	15,345.17	-100.00
URBAN DEVELOPMENT	30	134,055.93	139,282.13	5,226.20
GRAND TOTAL	**1071**	**12,66,248.36**	**14,26,985.93**	**1,60,737.57**

Table 3

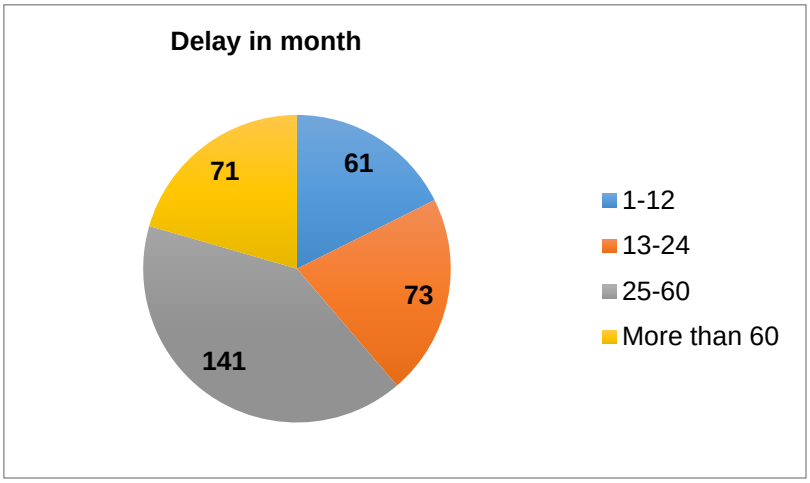
Status Summary - Infrastructure Projects [6]

Table 4

- Total 1071 projects
- 5 Projects ahead of schedule
- 258 Projects are on schedule – (25%)
- 346 projects are delayed – (33%)
- 238 Projects have cost overruns
- 467 projects have no completion date - (42%)

Break-up of 346 delayed projects [6]

Table 5



Infrastructure Projects Performance Analysis

According to above project performance data (Tables – 2, 3, 4,5) of the 1071 central sector infrastructure projects costing Rs 150 crore and above, 346 projects (ie. 33%) are delayed with reference to the original schedule. These delays in major infrastructure projects of various ministries worth Rs 14.3 lakh crore led to a cost escalation of 21.43%. The cost overrun across all monitored projects amounts to a whopping Rs 1.6 lakh crore. 467 projects (ie. 42 % of monitored projects) have inadequate performance reporting with no scheduled completion dates. This does not augur well. There appears to be a breakdown of governance and sponsor level interventions for course correction, with such large number of projects coming in late and 42 % of projects without a completion date. Overall there seems to be a serious insufficiency in professional project management capability.

Real Estate Projects Portfolio Performance

Such a consolidation of data on real estate projects is currently not available and an analysis on similar lines is therefore not feasible. However from reports of industry bodies [11] [12] [13] like CREDAI, RICS, CIDC, real estate industry conclave proceedings in recent years, it is seen that the challenges faced [5] [6] and project performance

insufficiencies are almost identical. The real estate projects are impacted by delays [10] of order of 43 % overall, with industrial projects coming in 'on' time in 85 % cases and residential projects 'on' time at a lowly 25%. The real estate projects are predominantly family owned businesses unlike the corporate structures and are perceived as lower on the project management maturity curve. This impedes implementation of best practices on governance, professional project management, talent attraction and staff development. The inordinately large delays especially in housing projects may be attributable to these facets.

Challenges impacting progress of projects across both segments [5] [6]

The major stoppages that hinder successful project completion are:

- Construction type challenges with direct impact on project execution and calls for professional project management skills at a tactical level.
- Non construction type challenges indirectly impacting project progress and are in the nature of inter-department coordination /approvals at state / central government level. It calls for deep program management capability at the strategic level with leadership/people skills in negotiating, influencing and problem solving.

Construction oriented project challenges
a) Funds flow – financial management
b) Lack of coordination between various Government agencies
c) Inappropriate structuring of the projects, particularly demarcation of risks and rewards between government and private sector
d) Lack of a proper dispute resolution mechanism between private players and government agencies
e) Debt burden of infrastructure developers, as a consequence of execution delays and irrational bidding in cases
f) Inability to effectively deal with integration challenges (of the different phases) and interdependencies across projects
g) Contractual Issues & Claims
h) Technology selection,
i) Change of scope,
j) Poor project management

Non construction type challenges impacting project progress
a) Land Acquisition Problems
b) Environmental clearances/concerns
c) Rehabilitation & Resettlement problems
d) Legal
e) Mandatory Clearances – Right of Way problems, Municipal permission and Statuary Clearances
f) Socio-political pressures

Time and cost overruns have been a major problem affecting the implementation of Central Sector Infrastructure Projects. Rigor in governance and oversight through ministry level standing committees has shown some improvement in project monitoring in recent times.

Reasons for Time Overrun	Reasons for Cost Escalation
a) Delay in land acquisition b) Delay in obtaining forest/environment clearance c) Lack of infrastructure support and linkages d) Delay in tie-up of project financing e) Delay in finalization of detailed engineering f) Changes in scope g) Delay in tendering, ordering and equipment supply h) Law & Order problems i) Geological surprises. j) Pre-commissioning teething troubles k) Contractual issues l) Unforeseen conditions	a) Under-estimation of original cost b) Changes in rates of foreign exchange and statutory duties c) High cost of environmental safeguards and rehabilitation measures d) Spiralling land acquisition costs e) Changes in scope of projects f) Monopolistic pricing by vendors of equipment services g) General Price rise / inflation **h)** Time Overrun **i)** Poor project management (contributes about 10 %) [14]

Insufficiencies in Current Management Approach

When Project Managers are tasked to manage large scale complex construction initiatives having multiple related projects with individualised project outputs, the tendency is to manage them like any conventional project. These large scale high impact construction projects (herein after called programs) need special skills beyond the science of project management. The role of Program manager emerges in this context and needs to be distinguished from that of the conventional project manager.

Program is defined as a group of related projects and other activities that are managed in a coordinated way to obtain benefits not available from managing them individually.

Program management needs holistic view of business strategy and its relation to the multiple project tracks. Synergy of various teams and their interdependencies need to be managed. Comprehensive view of the overall

program goals is needed while managing the program. It can be discerned that project management is at a tactical level dealing with people, process and tools and targeted to perform on the triple / n-constraints, while program management is at a strategic level and deals with aspects such as vision, mission, business benefits, efficiency of resource utilization, longer term planning for sustained benefits realization impacting large number of diverse stakeholders. All this demands higher order capabilities from the program manager.

> Program manager leads the program team in establishing program direction, identifying interdependencies, communicating program requirements, tracking progress, making decisions, identifying & mitigating risks and resolving conflicts & issues. Leadership is embedded in program manager's job and occurs throughout the course of the program.

New Approach to Construction Programs Management

A management and leadership framework for construction programs management that discusses innovative project management techniques together with ingredients to enhance the probability of success is outlined in succeeding paragraphs. This framework is at the intersection of PMI Standard for Program Management and CMAA (Construction Management Association of America) standard detailed through PMBOK practices read in conjunction with the PMBOK Construction Extension.

Overview of PMI's Standard for Program Management (SPM) approach:

Programs are initiated for achieving organizational goals and strategic objectives that are so impactful that they cannot be achieved by managing the constituent projects independently.

PMI based Standard for Program Management framework mainly consists of following key performance areas:

Key Processes

• Program strategy alignment
• Program benefits management
• Program stakeholder engagement
• Program governance
• Program lifecycle management
  ○ Integration management
  ○ Risk management
  ○ Communication management
  ○ Performance management

Supporting Processes
• Organization Change management • Procurement management • Contract management & Claims • Financial management • Knowledge management • Safety & Environment

Success Mantra for Construction Program Management

Stakeholders, from the general public to government departments and executives are demanding that infrastructure programs be more transparent and more innovative. This adds layers of complexity to the management of these programs. Notwithstanding; these programs are expected to be delivered on time and within budget and scope.

The challenge: How do you deliver increasingly complex programs faster, cheaper and better than ever before?

The good news is that in many instances construction programs have resorted to competency development and use of industry best practices and modern management techniques to bring in programs within acceptable threshold limits on considerations of time, cost and scope, to satisfaction of end users and society. There are pockets of excellence; with examples of some mega construction programs that have demonstrated stellar results:

- Delhi Metro
- Bandra- Worli Sea Link
- Indira Gandhi International Airport, Delhi

Much ground is still to be covered by majority of practitioners in the construction industry in understanding the value of formalized program management practices and supporting the development of competency in this area.

Successful programs are built upon a foundation of technical project & program management expertise, incorporating the more intangible success factors, such as a culture of open & honest communication, superior stakeholder engagement, and active executive sponsor support. The factors that impact program success spread across the dimensions of people, process, and tools. The process elements that can be considered to have high impact are the traditional elements of time, cost, scope, quality and risk management. However the more intangible process elements related to strategy, vision, governance, benefits and stakeholder engagement are the dominant contributors to program success.

The Success Mantra

The different success factors that are to be rigorously taken up for implementation during the program life cycle have been grouped across various phases:

1. Initiating phase

Initiation is about getting the program off to a great start. It is very important that programs are set up for success in the initiation phase and all the right ingredients addressed. The purpose of this phase is to define the program, secure funding, and demonstrate how it will deliver the desired benefits.

Success Mantra – Initiating phase
a. Manage the construction initiative as a program, not as a cluster of independent projects. b. Apply best practices highlighted in standards: I. Standard for Program Management® by the Project Management Institute (PMI®) II. PMBOK® by the Project Management Institute (PMI®) III. Construction Extension to PMBOK® by the Project Management Institute (PMI®) IV. *Construction Management Standards of Practice by Construction Management Association of America,® 2015* c. Set up the program for success I. Formal Business case appraisal with realistic expectations and an approved program charter II. Program sponsor appointed and program manager designated with authority III. Actively involved program sponsor with support from leadership level IV. Share VISION of organization / department and MISSION of program V. Encourage flexibility, adaptability & agility in management of the program VI. Create a governance structure to drive the activities during the program life cycle phases from concept to commissioning and beyond to benefits accrual d. Set clear business objectives that are aligned to organizational strategy e. Identify at start of program, benefits that are planned to be achieved. Evolve success criteria. f. Define exit / acceptance criteria

2. Program Infrastructure creation

Management effort that is relevant for program success which may not be related to any specific constituent project, but is needed as enabling infrastructure to manage the program.

Success Mantra – Program Infrastructure creation
a. Tailor process / methodology to suit program peculiarities; at level of program management & also at level of project management b. Invest in capability development and capacity creation c. Develop MIS & formats for reports and communications d. Create culture of transparency & accountability

3. Planning Phase

Planning involves converting strategic objective to program goals. Scope of the program needs to be clearly identified and should align with strategic objective. Program goals needs to be decomposed into multiple manageable project tracks for effective management and focus.

Success Mantra – Planning Phase
a. Make the plan with achievable commitments b. Develop WBS that facilitates performance tracking, status monitoring & effective control

c. Pay attention to estimations of time, cost and quantities.
d. Develop risk management doctrine and revisit risks right through the program lifecycle
e. Plan for rework
f. Plan for contingencies. Build management reserve for extreme situations.

4. Tracking Progress & Control phase

Success of program depends on its close alignment with meeting the business objectives. Alignment can be ensured by program governance models and effectively measuring the performance of the program in relation to its needed objectives. Variances need to be managed by effectively implementing strategies to reduce the negative deviations.

Success Mantra – Tracking Progress & Control phase
a. Track status openly & honestly
b. Consistently monitor and evaluate program performance
c. Assess planned Vs actual
d. Mark tasks done only when 100% done

5. During Program Lifecycle

Communication plays a critical role to effectively manage interfaces between stakeholders, processes and organizations. Governance structures help in enabling the communication and faster decision making. It also ensures that any decision taken is in the interest of larger program objective.

Success Mantra – Program Lifecycle
a. Effective stakeholder engagement
b. Communicate, communicate & communicate
c. Build and maintain cohesive and motivated team
d. Manage diversity
e. Process implementation rigor especially in areas – procurement, contracts, risks and integration management
f. Governance structure to facilitate stage gate reviews, change management, course corrections, risks & issues management,
g. Benefits - planned vs actual
h. Benefits transition
i. Benefits sustainment

6. Learning

Unlike most other industries, construction industry does not usually have the benefit of a prototype stage. This calls for structured systems for learning from the past experiences and from other projects misses / omissions.

Success Mantra – Learning
a. Learn from experiences of earlier phases and their suitable incorporation in subsequent phases
b. Learning can deliver impact on team productivity
c. Create a knowledge base for future use

7. Stakeholder engagement

Large programs usually have many stakeholders who can potentially impact the program in positive or negative way. Stakeholder needs and expectations need to be managed to ensure a successful program. Support from various stakeholders can be guaranteed only if they are involved in decision making process, communication process and periodic review meetings.

Success Mantra – Stakeholder engagement
a. Develop a culture of open and honest communication
b. Set up a communication plan
c. Keep stakeholders fully engaged and have a plan for dealing with the negative stakeholders

8. Governance

Governance structures like PMO, Program Board /Steering Committee, help in decision making and controlling the scope of the program. It is important that scope is within the boundary of program charter and delivers on promised benefits.

Success Mantra – Governance
a. Develop program structure – Org chart
b. Actively involved executive sponsor
c. Spell out roles & responsibilities

Benefits of managing as a program

Benefits of program management
a. Direct linkage of product/service development efforts to business objectives
b. Related projects having common objectives and funding are linked into a coordinated & synergistic whole
c. Improved resource management & utilization across multiple projects, sites & geographies
d. Cross-functional coordination & control contributing to improved time-to-market, cost, & quality
e. Consistency in managing program & projects, reporting of progress
f. Effective risk management across inter-related projects & programs
g. As program manager responsible for success of the construction initiative and delivery of planned benefits to stakeholders
h. Enablement of benefits through program transition and benefits sustainment plans created by program manager. Realization of sustained benefits in many instances happens much after the program has been closed

CONCLUSION

The emerging challenges have to be professionally managed and new management frameworks like Standard for Program Management® by the Project Management Institute (PMI®) adapted, through incorporation of construction industry best practices and knowledge sharing. These techniques that have worked in other mature industries like engineering and information technology might need to be selectively replicated in the construction industry.

The Four dominant themes that emerge from the success mantra are:

- Open & honest communication culture,
- Focus on Benefits
- Superior stakeholder engagement, and
- Active executive support.

Clearly, these themes are interdependent and it is the delicate balance between the factors that really fosters success. As maturity of program management practice percolates across the construction industry, and the isolated successes are replicated to become the 'new normal', a self perpetuating cycle of successes will emerge to deliver immense cost savings through efficient and effective management of programs.

The success mantra for construction program management can be applied not only across major and mega programs but also to small and medium construction programs. All construction programs have the potential to succeed, with the right program manager, right team, and rigorous implementation of the mantra outlined. The nation cannot afford the high cost of poor project and program management.

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