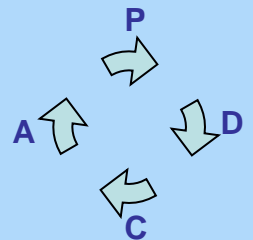


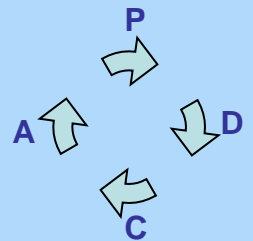
# Development of Mathematical Model for Business Processes in Information Technology Organizations

By Research Scholar  
Abhay Juvekar



# Agenda

- Research Topic & Uniqueness
- Challenges in Indian IT Industry
- What is mathematical Model ?
- Characteristics of Mathematical Model
- Need to do research on Application of MM to IT
- Key Performance Indicator (KPI)
- Tools & Techniques
- Research Objective
- Corporate Tiers, Goals & Stakeholders
- Corporate Tiers & Equations
- Business Benefits
- Standard Research methodology
- Customized Research methodology for my research
- Expected Results out of my research
- Q & A

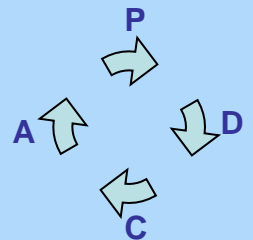


# Research Topic & Uniqueness

**Topic :** Development of a mathematical model for Business Process in Information Technology Organizations

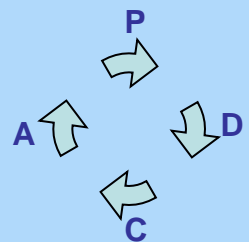
## Uniqueness of Research Topic:

- Business Value of Mathematical Model has resulted in widespread adaption across IT industry. Three Tier oscillating mathematical models are not implemented in IT.
- The model can be calibrated for non performing (sick) industry in reactive fashion.
- The model can be calibrated for performing (Non-Sick) industry in proactive fashion.



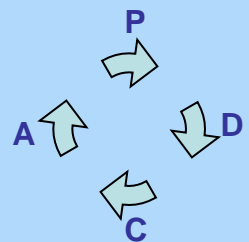
# Challenges in Indian IT Industry – Organizational Related

- Attrition
- Overrun of cost , Schedule and efforts
- Inaccurate Estimates
- Mergers & Acquisitions
- Global Delivery pressures v/s sub-standard infrastructure v/s poor skillset
- Layoffs of Top and Middle Management
- Lack of capability training
- Margin pressures
- Gap between skillset available and expected.
- Lack of tools, techniques, methods & trainings.
- Domain Knowledge Experts are not the developers
- No technical & domain ladder in Indian IT Industry
- Resources are pulled to next levels without capabilities & knowledge



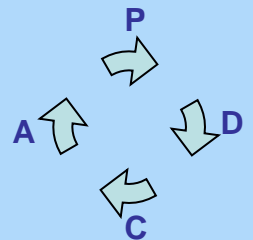
# Challenges in Indian IT Industry – Customer & Market Related

- Customers are unaware of the requirements. Training customer is must.
- Saturation in IT markets (Globally as well as Locally)
- Periodic Recessions across the globe
- Requirement Volatility, Ambiguity & Complexity (Poor Requirement Stability Index)
- Fluctuations in the exchange Rate
- Arrival of millions of IT professionals in market place.
- Incapability of vendors to understand the customers.
- Stock market manipulations in the IT industry.
- Technology Instability



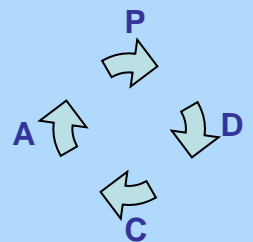
# What is Mathematical Model ?

- Process of applying Mathematical equation to real world problems
- Comprehends the real life situation
- Estimation of future predictions & provides justifiable answers
- Phenomena to be studied, understood and controlled.
- Problem solving is made lucid, creative & iterative process
- Better precision, design & control of applications
- Linear, Dynamic & explicit model
- Stochastic & deductive
- Optimum utilization of computing capabilities
- Compares hypothesis with data
- Clarifies Assumptions, variables & parameters
- Forecasts designing, managing & optimizing IT processes
- Allows simulation & multi-dimensional analysis of the system



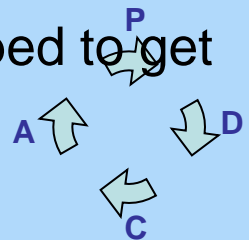
# Characteristics of Mathematical Model

- Robustness, Precision, Consistency
- Realistic in Nature
- Scalability, Reliability
- Feedback based continual improvement
- Adaptable to regulations in the control system
- Versioning feature available for refinement & statutory/legal changes
- Best possible predictions of dependent variables v/s independent variables
- Extrapolates future results with high precision
- Sustainable, Agile and Nimble
- Easy for Refinement, calibration (Maintenance)
- Uses parameter values which matures and improves the model
- Recalibration after changes in the environment & time



# Need to do research on application of MM to IT Industry

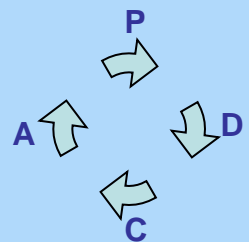
- Pain areas in Metrics and Measurements in IT Industry are not identified and addressed.
- High rate of Metrics and Measurements failure
- Lack of sustainable, scalable & capable business processes.
- Inadequate MM implementation for sake of certifications, assessments & audits
- Lack of translation/transformation of Goals Business → Delivery → Vertical → Account → Program → Project using MM & Vice-versa.
- Poor usage of MM into Business building, expansion and retention
- Ploughing academics MM knowledge & implementation into corporate world and vice versa.
- Absence of three tier oscillating model for sick (non-performing) as well as non-sick (performing) industry. (Technique for Sick to transform to Non-Sick)
- Absence of proactive measures for Non-sick industry's sustenance
- Horizontal & Vertical Dependencies are not mathematically mapped to get the results.
- Non-Sick to move up in value chain





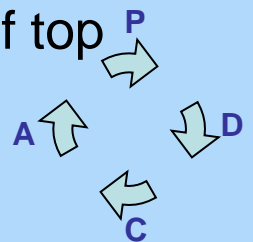
# Need to do research on application of MM to IT Industry

- Lack of setting Metrics Office, productivity council & knowledge management cell.
- TCV falling down due to global competition, lack of efficiency & productivity
- Margin improvement



# Ker performance Indicator (KPI)

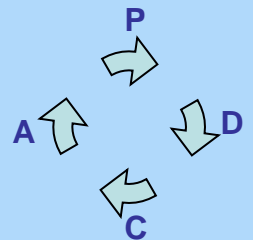
- Metrics : Standard of measure of a degree to which IT system possesses required property. Compares performance towards goal.
- Metrics are functions. Measurements are numbers obtained by application of Metrics. Measurements can be controlled. Metrics can be tracked.
- KPI are the Metrics that matter(Eyes & Ears) to organization.
- Roll-up and Roll-down of KPIs at project, program, vertical & Org level contribute to tier level KPIs.
- Voice of Process must be always powerful than voice of the customer.
- B2G (Back to Green) plan is implemented & tracked to bring project/program/vertical to safe zone.
- Live KPI dashboards (Health of the company) are under radar of top brass.



# Tools & Techniques

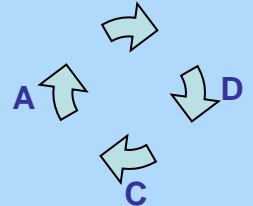
Following tools and techniques are used in my research.

- Goal Decomposition Method (GDM)
- Goal Question Method (GQM)
- Balance Score Card (BSC)
- Mathematical Models (Regression Equation)
- Control Charts, plots
- Process Sigma Charts
- Mini-Tab
- Macro based Excel
- Monte Carlo Simulation Technique



# Research Objectives

- For sick industry, to develop reactive solution based on pain areas to transform into non-sick industry. .
- For non-sick industry, to develop proactive solution to move up in the value chain.
- Continual improvement
- Oscillating, Self-adjusting, linear MM using multi-tiered regression analysis (Roll-up & Roll-Down) for multi-tier organizations.
- Monitoring, tracking the implementation results for couple of years (Future)
- Capability, stability of the process & there by robustness of the model (Future)
- Calibration of goals when the process is process stable & capable. (Future)



# Corporate Tiers, Goals & Stakeholders

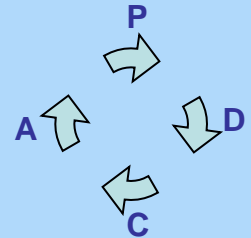
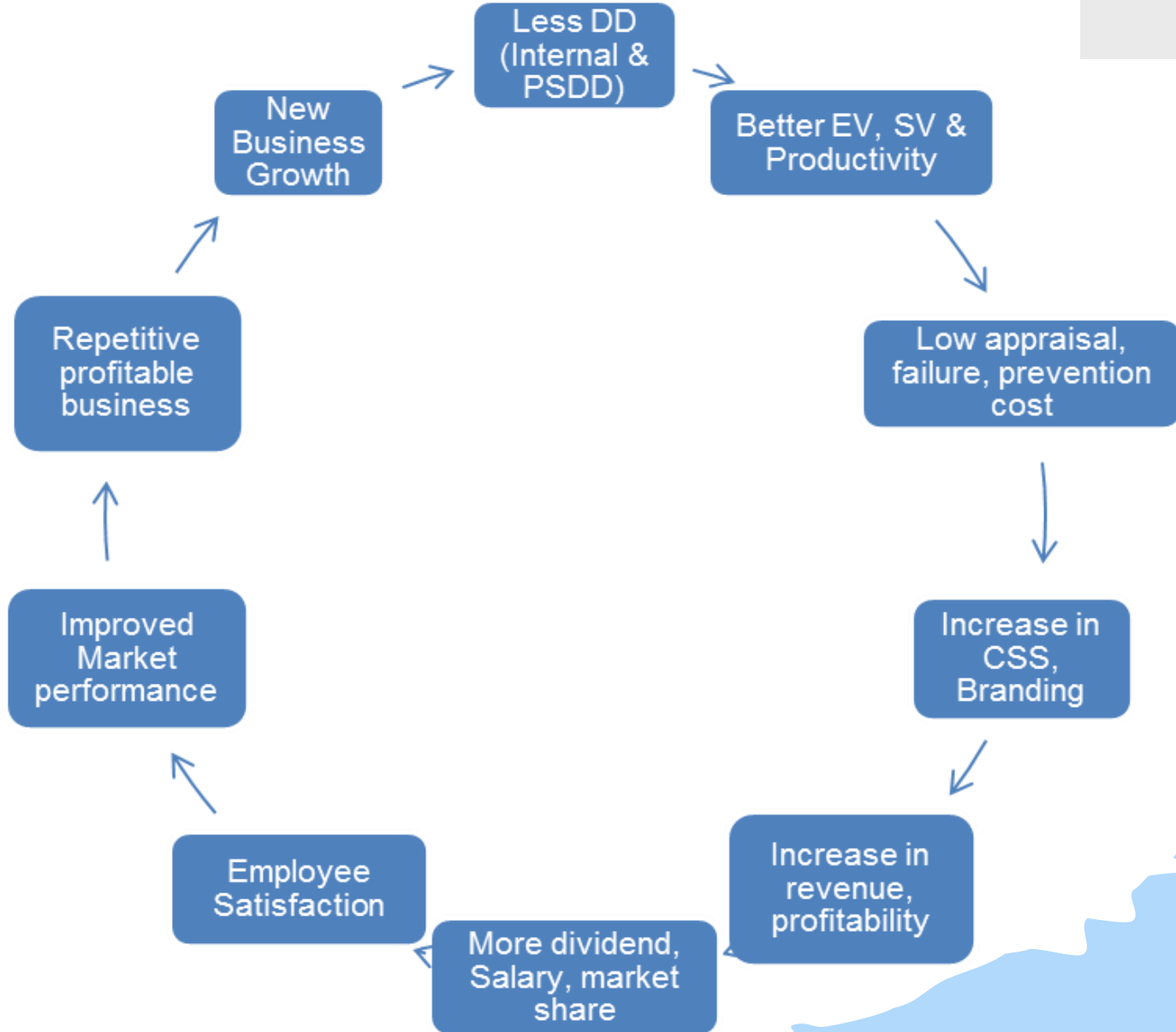
Tier	Unit	Goals	Business Stake Holders
Tier I	Organization	Profitable Growth, CSAT	CDO, CTO, CIO, CPO, COO, CEO, Shareholders
Tier II	Vertical	Schedule Variance, Effort Variance, Productivity, Requirement Stability Index, Cost of Quality, Defect Leakage, Post Shipment Defect Density, Internal Defect Density	Vertical Head, Account Head
Tier III	Program, Project	Schedule Variance	Program Manager, Project Manager, Delivery Manager



# Corporate Tiers & Equations

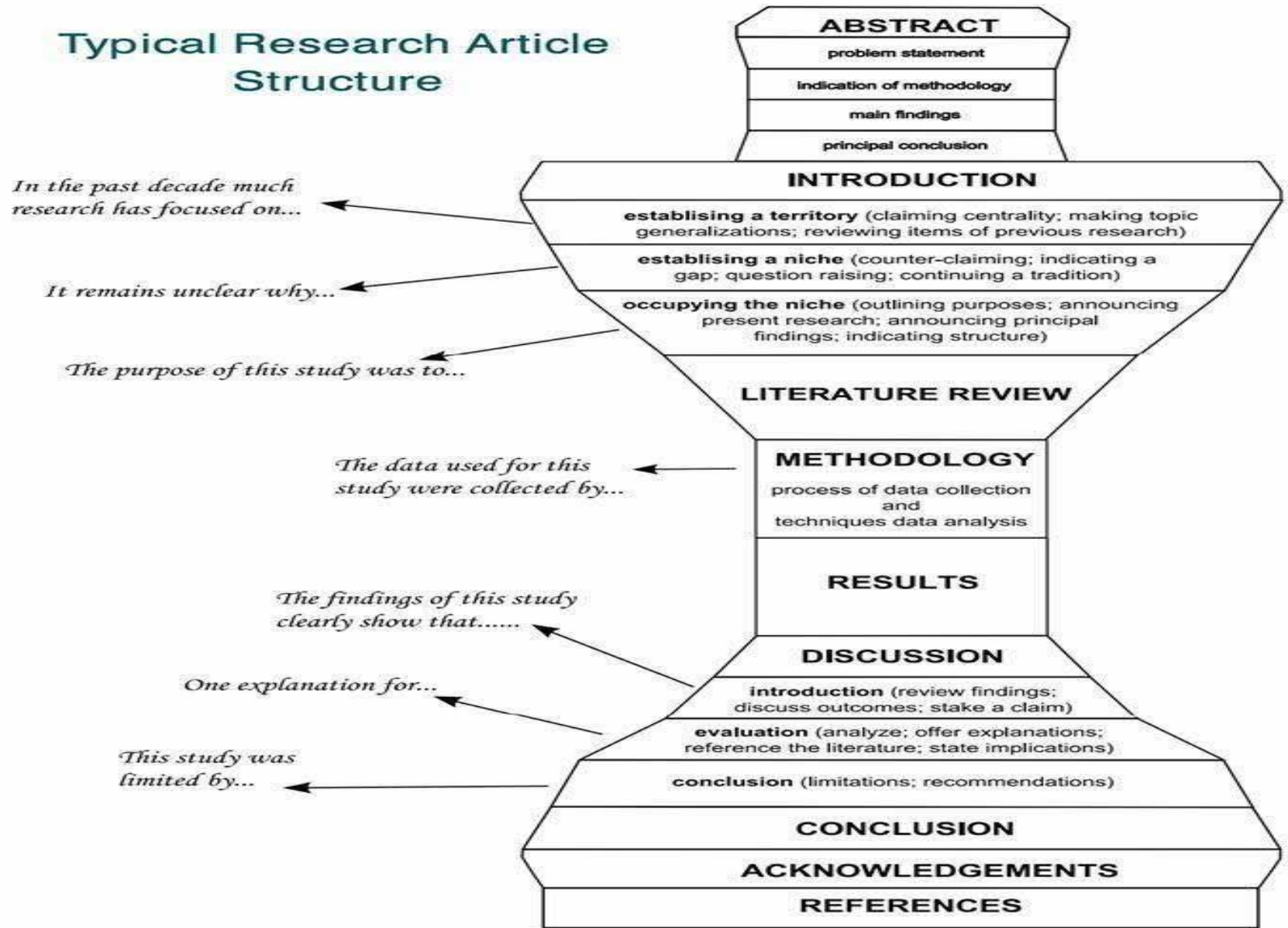
Tier	Unit	Y	x's (Measurable, Upstream & Controllable)
Tier I	Organization	Profitable Growth	$Profitable\ Growth = f(SV, EV, PSDD, CSS, RSI, RE-R\ REQUIREMENT, DD-DESIGN, RE-DESIGN, DD-CODING, RE-CODING, EFFICIENCY-UT, EFFICIENCY-ST, PRODUCTIVITY, COQ)$
		CSAT	$Customer\ Satisfaction = f(SV, EV, PSDD, RSI, PRODUCTIVITY)$
Tier II	Vertical	Schedule Variance	$Schedule\ Variance\ \% = 0.0356 - 0.001377\ RE\ REQUIREMENT\ EFFORT - 0.0894\ REQUIREMENT\ DEFECTS\ COUNT + 0.00363\ DESIGN\ REWORK\ EFFORT - 0.000207\ CODING\ EFFORT - 0.007322\ CODE\ REWORK\ EFFORT + 0.00971\ CODING\ DEFECTS\ COUNT - 0.3993\ SYSTEM\ TEST\ DEFECTS + 0.0883\ SYSTEM\ TESTING\ REWORK\ EFFORT + 0.5174\ UAT\ DEFECTS - 0.02984\ UAT\ REWORK\ EFFORT$
Tier III	Program, Project	Schedule Variance	<p>Same equation is adapted as same problem is persistent across the tiers.</p>

# Business benefits



# Standard Research Methodology

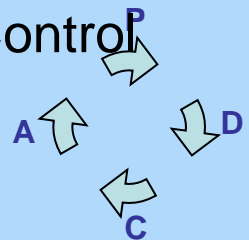
## Typical Research Article Structure





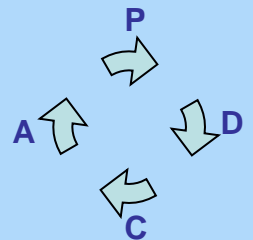
# Customized Research Methodology for my research

- Identification of Research topic
- Literature survey
- Initial survey to establish uniqueness (Experience Survey)
- Research Stakeholders contributing to research
- Secondary data purchase from authorized data supplier
- Collection & Cleaning of secondary Data for Business model
- Acceptance of data using baselined criteria
- Performance capability Baseline for year 2014, 2015
- Building & adopting MM (Tier I, II, III)
- Performance for year 2016, 2017 is tracked with the help of control charts
- If results are OK, adapt the model.
- If results are not OK, MM needs to be calibrated for fitment.
- Measurement & Analysis of results of adoption of MM (Tier I, II, III)
- Validating, Monitoring & tracking of results for couple of years (Control Charts)
- Tightening of goals if needed after success



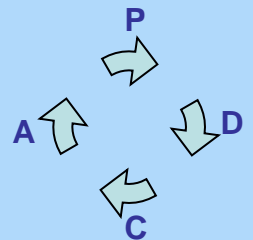
# Expected Results out of my research

- Strong bond between tiers (co-relation)
- Impact on one tier strongly affects other tiers (Oscillating)
- Control Sub-process(X1) to control critical process (Y)
- Control over Delivery objectives yields control over Business Objectives & Vice-Versa.
- Measurement of success of application of MM to sick industries after implementing MM (reactively) and sustenance.
- Measurement of success of application of MM to non-sick industries after implementing MM (pro-actively) sustenance.
- MM to achieve profitable growth, improved quality of work, branding, customer loyalty and moving organization up in value chain.
- MM implementation results are measured, analyzed & monitored for couple of years
- Goals are tightened for coping with changing business needs, market conditions, better results to all the stake holders.



# Questions & Answers

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**Thank You**

