

Capgemini

Estimation

Approches

Perception to Preferences Oct 2020

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Capgemini is a global IT services provider organization with more than 270,000 women and men in over 50 countries. We work with world-renowned clients to find solutions to their most demanding challenges. As a global leader in consulting, technology services, and digital transformation – with unrivaled sectorial expertise – we enable our clients to design and build tomorrow's businesses, make the most of the opportunities offered by technology, and **boost their competitiveness** and agility.

At Capgemini we see things differently



Our Vision

The business value of technology comes from and through people.

Our Mission

With you, we create and deliver **business and technology solutions** that fit your needs and drive the results you want.

What We Do?

- Capgemini is a global leader in consulting, digital transformation, technology and engineering services.
- The Group is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong
 50-year+ heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations.
- Capgemini is driven by the conviction that the business value of technology comes from and through people.
- ♦ With Altran, the Group reported 2019 combined revenues of €17billion.

Perception to Preference - Abstract



Diversity In Adopting Estimation Approaches: Businesses have started acknowledging the importance of **Emotional Intelligence** – not only in managing software / IT projects but also in early stages of projects, like during Bid / Proposal / negotiation phases and for estimating proposed Software project's Effort & Cost.

Teams that are bringing in new business for IT Services organizations may have different levels of Analytical skills and preferred approaches towards offering solution o the client. Interesting to note that; not any approach is right or wrong, but it is the outcome of an approach that will decide How Fit it is, for the given purpose.

As the value delivered by an IT/software project is always subjective and software deliverables usually are kind of **'Intangible**' in nature; it adds to the complexity and uncertainty to the process of estimation. This fact clubbed with the person specific <u>preferences towards perceiving</u> the proposal brews into convoluted estimations and subsequently this weak foundation of estimates may become one of the causes of projects failure.

An effective estimation platform providing diverse methods that are suitable for entire spectrum of stakeholders is need of the hour.

Aim: Study & Analysis of various perceived & preferred approaches adopted by winning teams for estimating Software Projects and determining their effectiveness.



Why Estimate?

Need for Estimation cannot be denied in any business activity – Let it be of any kind: Civil, Mechanical, Real Estate, Name one. So, the same goes for Software too. Let us look at some important factors behind estimating Software Projects

Business Justifications	Business Organizations are answerable to investors and stakeholders for any kind of investment and the RoI to be established.		
Success of a Project	It is largely dependant on the reliable estimate of course produced at the beginning of the project.		
Effort Distribution	Holistic estimates allow determining efforts for various phases & workstreams / disciplines within the project.		
Resources Loading	Helps establish effective staff pyramid, resources loading to produce the contractual schedule.		

Why Estimate? Contd..

Monitoring & Control	Establish cost baselines and monitor overruns, to take appropriate corrective action(s) to bring the project back on track. This is only possible if the management knows the base estimate / cost.		
Base to handle future disputes	Unambiguous Estimates contributes to build a mutually understandable contractual agreement between client partner & vendor(s). In many legal litigations baseline estimates are always referred to.		
Team Performance	Effectively manage teams & derive team's productivity & efficiency.		
Organizational Repository	More importantly matured Organizations learn lessons to improve on productivity & efficiency for future projects.		

Impact of Agile Delivery on Estimations.



Advocates of "New age" software delivery methodologies, like **Agile** are promoting <u>#NoEstimate</u>: There is a lot of movement going on to eliminate need for an estimate for a software project to be deliver in Agile methodology. But there is no mention found how the business-critical parameters can be satisfied without estimating any Software Investment!!!

Building and delivering Business Software is not a mere Home affair like Shopping ... !![©] That is the only activity one can think of where there are #NoEstimates required!

What wrong estimates will lead to?



Challenges Producing Estimates

- Accurate Estimates' is always a paradox. It is not about Accuracy of the Estimate but it is about its RELIABILITY.
- We would know Estimate's accuracy only at the end of the project!

Why Estimating a software project is so difficult?

Mainly 2 categories:

External Factors:

- Client Side / External to Service Provider Organization.
- Includes diversity in various parameters of a software project / Solution to be delivered

Internal Factors:

- Organization's structure and culture.
- How solutioning teams are approaching towards assessing the proposed solution.
- Staff's skills and perceptions plays an important role.

External Factors





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Other / Internal Factors



Additionally, these aspects of software projects make it difficult to estimate efforts

• Software is Intangible in nature Intangibility • It is difficult to quantify. Size • Unavailability of industry standard and prescribed methods to size the software. **Measurement** • Usually it is very complex to establish the size of software at early stages of project • We know how difficult it is to gather the post project data! **Reference Data** Past effort data for similar projects is either not available or projects do not refer to Performance • Difficulty in establishing Organization's Performance baselines. Baselines • Taking into considerations productivity accelerators used in past projects. Managing • Software changes usually creep in discretely. Changes • Re-baselining estimates to include in-flight change requests. Organizational • Big size IT Service providers have a diverse staff with a spectrum of skill sets **Diversity** • A set of individuals may have a different approach towards problem solving.

Organizational Diversity



- Internally to an Organization, the teams of Business Analysts and Solution Architects have several different competency levels of Analytical skills.
- The approach towards designing and assessing solutions differ amongst the teams and individuals.



We will see how this diversity can be effectively addressed.

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How to address Diversity? Estimation Tools & Techniques





Experienced Experts

Few rely on their white / grey hair – the experience.

Analytical: while others are having deep analytical skills and tend to dissect the scope to smallest units and estimate each unit to roll it up at project level.



Methodical: Few others rely on organization provided baselines and directions.

It is seen that there are wide variety of experts within the organization having mastery over different (preferred) approaches towards estimating the software applications.

- Respecting this diversity towards Estimation approaches, we identified a need of a Unified Estimation framework which will allow every one's preferred approaches and letting all types of experts / advocates of these different Estimation methods to apply their preferred estimation techniques.
- As we know there is no right or wrong in using any of these approaches, each one has its own merits / de-merits. Also, few approaches work in specific circumstances. So, with these bouquet of approaches, we produced a **measurable framework** which will help one decide which approach is best suitable for a given situation.

Estimation Approaches

Estimation Framework Offering range of Approaches

The diversity in preferred estimation approaches by Bid / Winning teams is addressed by a Unified Centralized Estimation solution.





Our Unified Centralized Estimation offers a wide array of Estimation techniques. This ensures there is an appropriate approach available for each type of user.

NB: This is an everevolving framework and considers next waves of Technology

Estimation Framework Offering range of Approaches



Expert Judgement 3-Point PERT	Analogous Similar Projects	Components WBS Driven	Top-Down Parametric	Bottom-Up
PERT uses a three-point estimation approach for a task. Any task filled with uncertainties can have a wide range of estimate in which the task actually will get completed. Uncertainties include both favourable conditions (opportunities) as well as unfavourable conditions (threats). PERT includes statistical analysis. The 3 points of estimates are as below: Optimistic estimate – Estimate when all favourable things will happen (all opportunities happen and no threats take place) Pessimistic estimate – Estimate when all unfavourable conditions happen (all threats happen and no opportunities take place) Most Likely estimate – Estimate when both favourable and unfavourable conditions will happen	Analogous – past similar projects: Analogous estimations are made based on the time or cost taken by similar older projects. Thus, these estimations are based on the experience of the team or the history of the project. The one disadvantage of this method is that the estimation may not always be accurate. For example, If an HRMS application for a mid-size organization required 20 Person Months of efforts. And a similar application is being estimated for similar sized client. It can thus be assumed that the analogous estimation is around 20 Person Months.	 WBS / Component Driven: Functional and Activity break- down. Functional WBS – In functional WBS, the software Application scope is broken down based on the functions in the application to be developed. Then each functional component is estimated separately. Traceable: This method breaks down the required effort into traceable components that can be effectively assessed, estimated, and tracked; the component estimates can then be rolled up to provide a traceable estimate that is comprised of individual components that are more easily managed. Hence this forms a detailed basis for overall estimate. 	<text><text></text></text>	 Each technology platform has a defined delivery method. The Method also has defined Work Breakdown Structure (WBS). It defines and groups a project's discrete work elements (or activities) that make up the total work scope of the project. Project activities are estimated separately & are aggregated to give Workstream, Phase & Project-level estimates for each delivery location. The estimation relies on total size of the functionality, effort drivers for each activity and individual effort metrics. It needs Software Size

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Need for Software Sizing Method(s)



Top-Down and Bottom-Up Estimation Approach needs Software Size.

There are various industry standard practices evolved to "SIZE" the software.



The Centralized Estimation Framework also supports different sizing techniques.

This ensures alignment with industry best practices.

NB: This is an everevolving framework and considers next waves of Technology

A quick look at Software Size

As we see Top-Down and Bottom-Up are effective estimation techniques. But important fact is it needs Software Size to derive efforts using these techniques.

In industry there are various recommended Sizing Methods:



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Measurement Framework

Now since there are various methods available, next question user asks is which is the suitable method for me?



We tried to answer this by defining a selection framework which consists of identifying success parameters for each of the approaches.

Measurement Parameters - Surveyed



TAT

- Average duration taken to produce an effort estimate for any given size of project and approach
- TAT was measured on a scale of 'Highly Time Consuming' to 'Very Quick'
- This is a very critical factor for winning teams expecting to produce Estimates on-the-go!

Accuracy

- Also termed as Reliability.
- There has a tradeoff with TAT
- The fate of a particular bid depends on how Accurate it has been estimated.
- Over-Estimate we lose on the pursuit, and
- Underestimate will make delivery teams slog.

Reproducibility

- This factor denotes the consistency in measurement.
- If estimated by two or more users for same scope and same approach over the period of time, then how repeatable the produced numbers are.
- Very important for mission critical projects.

Repeatability

- It is consistency in measurement obtained when the same user estimates for same scope using given approach over the period of time.
- Repeatability plays an important role during long running pursuits.
- Client usually takes a long time for decision making and may ask for several quotes.

We conducted a survey asking users to evaluate various Estimation Approaches and Sizing Techniques on these Measurement Parameters... and the results were interesting!!!

Estimation Approaches – Their Scores





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Sizing Approaches

Preferred Sizing Methods





Role of NFR & PQ



Productivity factors relate to the project environment rather than to the product that will be built:

- Experience of the project team'
- Stability / definition of the requirements
- Availability of appropriate hardware environment

The impact of Productivity factors on the total estimate is addressed through productivity questions (Prod-Qs) and non-functional requirements (NFR-Qs) which describe the deviation of a project from the norm and directly impact effort at the Discipline level

Consider the various environmental factors that would influence your project during delivery - A corresponding percentage impact on effort across each Discipline of the WBS is calculated and displayed

Role of NFR & PQ



Project Environment Factors e.g.:

- Knowledge of the business domain.
- Knowledge of the project's technologies & systems.
- Difficulty of integrating the team relative to size of the project.
- Knowledge of the customer and/or third party suppliers.
- Expected planning issues anticipated due to staff members switching between sub-projects.
- Extent of client involvement in formal process surrounding S/W development & artefact signoff.
- Impact of Organization Tools.
- Productivity impact of the Project Size and Expected Peak Team Size of the project compared to an 'average' project.

Non-Functional Requirements (NFRs):

- User interface complexity
- Solution flexibility
- Ease of installation
- Complexity of the operability requirements
- Distributed system
- Performance & load requirements
- Reliability and failsafe requirements
- Complexity of security requirements
- Reusability
- Cross-platform portability
- Pre-determination of development environment & tools
- Suitability of technical architecture

Conclusion

Conclusion



These survey findings help us conclude that:

- 1. For big IT Services provider Organizations, the diversity in perceptions need to be addressed.
- 2. Based on Perceptions, users have various diverse Preferred Approaches towards Software Estimations
- 3. All of them have their own merits / de-merits
- 4. A centralized unified Estimation Framework helps cut-down silos in the organization and helps Institutionalize Estimation Process.
- 5. There is not a Single approach which is Right OR Wrong.
- 6. Users should select a particular approach based on:
 - ✓ One's skill levels
 ✓ Demand Of Situation
 - ✓ Preferences
 ✓ Client Background



He is Design Authority in Capgemini Estimation group with 20 years of Industry experience. Has introduced revolutionized tools and processes for software estimations & the way winning teams are estimating software projects

Meet Us



Carl Bideau Guide & Mentor

Senior Estimation Analyst | Design Authority

Estimation Expert with 9 years of Industry experience; working towards developing efficient and innovative tools and techniques for estimating software

Ria Bakhtiani

Estimation Expert - Capgemini, Mumbai, India

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The figures produced with the process of estimation may or may not help but the process does...! For sure...

THANK YOU!

Questions??

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People matter, results count.

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Learn more about us at

www.capgemini.com

For more than **50 years**, the way we operate, work and collaborate has been guided by our **seven core values**



At the heart of everything we do

These values have shaped who we are today – a **responsible leader** determined to create a positive impact on all stakeholders within our ecosystem.