Why Solutions Fail and the Business Value of Solution Architecture

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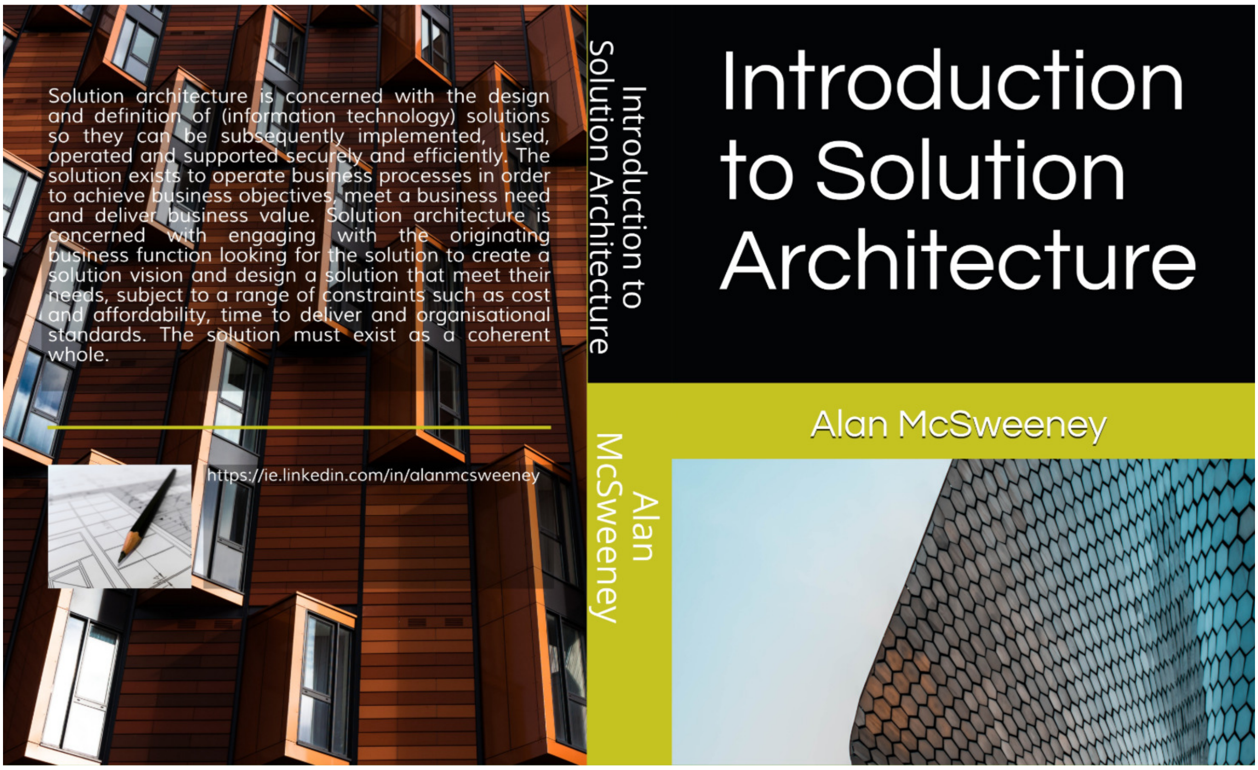
Why Solutions Fail and the Business Value of Solution Architecture

Extract from ***Introduction to Solution Architecture***



Solution architecture is concerned with the design and definition of (information technology) solutions so they can be subsequently implemented, used, operated and supported securely and efficiently. The solution exists to operate business processes in order to achieve business objectives, meet a business need and deliver business value. Solution architecture is concerned with engaging with the originating business function looking for the solution to create a solution vision and design a solution that meet their needs, subject to a range of constraints such as cost and affordability, time to deliver and organisational standards. The solution must exist as a coherent whole.

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Introduction to Solution Architecture
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Introduction to Solution Architecture
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Paperback - https://www.amazon.com/dp/1797567616

Kindle - https://www.amazon.com/dp/B07P2NCFDQ

Chapter 3. Business Strategy, Architecture Strategy and Solution Design and Delivery

3.1 Why Solutions Fail

This information provides a solution architecture perspective on why solution delivery fails. Getting the architecture and design right puts the solution delivery project on a solid foundation and maximises the likelihood of success. The delivery estimates use a realistic solution scope with all factors included. Getting the solution architecture and design wrong puts the solution delivery project on an unstable foundation and negatively impacts on the deliverability of the solution and the probability of success of the solution delivery project.

It is a reasonable statement that in the minds of many people failure is synonymous with information technology projects. While this perception is an exaggeration, the outcomes of many IT solution delivery projects represent failures to at least some extent.

It is also often true that solution delivery failure is attributed to project management failure such as the quality, skill and experience of the project manager or the misapplication or lack of application of a project management methodology. However, the most effective project management will not make an undeliverable, unworkable, unusable solution deliverable, workable or usable.

The solution architect should concern himself or herself with the ultimate success of the project to deliver the designed solution. There are several organisation characteristics that negatively affect this:

- As described in section 2.6 on page 51 the solution delivery process can be siloed with multiple hand-offs, including that from solution architecture to project management and solution delivery
- The solution design produced by the solution architect does not or is not allowed to include the full scope of the solution

These are not mutually exclusive and regularly occur together.

The goal of the solution delivery project is to successfully implement the right solution. This is a combination getting the solution design right and then implementing this design successfully. The two areas are connected: the right solution design includes identifying all the solution components that comprise solution delivery. The delivery project can then implement these.

There is little, if any, merit in initiating a delivery project to implement a solution if the scope of that solution is not well-defined. Any scope definition work needs to be moved to a separate activity focussed on just that purpose so that when solution implementation starts, its scale and extent are well-defined and accepted or the uncertainly of the solution design needs to be accepted and embedded into the delivery project such as in an agile process. The topic of agile solution delivery is discussed further in Chapter 6 on page 423.

		Solution Identification and Design	
		Wrong	Right
Solution Delivery	Unsuccessful	*Wrong Solution Unsuccessfully Implemented*	*Right Solution Unsuccessfully Implemented*
	Successful	*Wrong Solution Successfully Implemented*	***Right Solution Successfully Implemented***

Figure 32 – Goal of Solution Delivery – the Right Solution Implemented Successfully

It is a continuing truth that the combination of the successful delivery of the right solution still occurs infrequently.

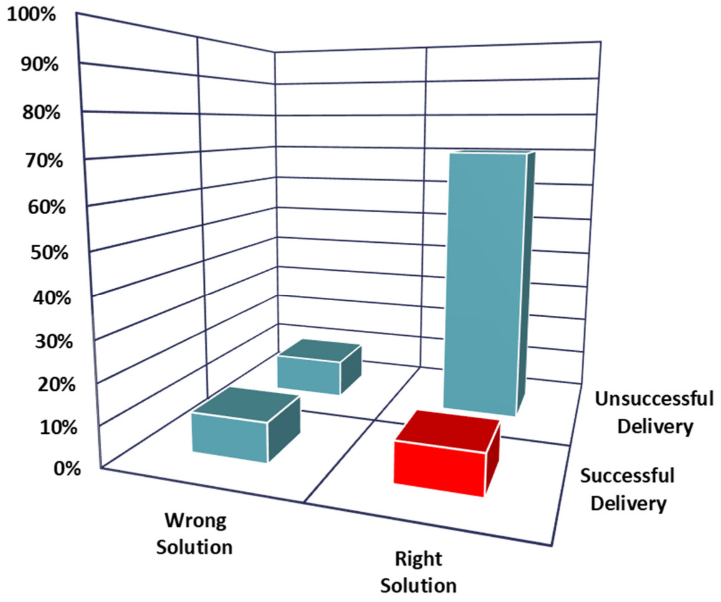

Figure 33 – Right Solution Delivered Successfully is in the Minority of all Solution Delivery Outcomes

This section is not intended to be a comprehensive review of project management literature. It is intended to illustrate how good solution design contributes to solution delivery success and reduces the prospects of solution delivery failure.

Section 4.4.2 on page 135 which describes the importance of business processes (and organisation change) to solution success can be referred to when reading this section. The solution ultimately exists to implement the business process.

Also, the problem of Shadow IT referred to 3.3.5 on page 87 can be viewed as another form of solution delivery failure where the business function sources the solution externally rather than from the internal IT function and without the knowledge or involvement of the IT function. Secondly, many business-acquired solutions whose delivery was challenged do not appear in any project failure statistics.

Over two decades has passed since the first Standish Group CHAOS report[4] on the state of delivery of information technology projects was published. The results from this study are well known and often quoted:

> *… staggering 31.1% of projects will be cancelled before they ever get completed. Further results indicate 52.7% of projects will cost 189% of their original estimates.*
>
> *On the success side, the average is only 16.2% for software projects that are completed on- time and on-budget.*

Solution delivery success and failure are not binary options: there is a domain of outcomes between complete success and complete failure. There are many reasons why the implementation of a solution may be regarded as less than successful. These reasons are not exclusive: the delivery of a solution can demonstrate more than one of these characteristics. Also, they are not binary factors: each of these solution deficiency issues can be more or less serious, representing a greater or lesser level of solution delivery non-performance with respect to that factor.

The CHAOS reports classify projects outcomes according to three categories:

1. ***Success*** - The project is completed on time and on budget, offering all features and functions as initially specified.
2. ***Challenged*** –The project is completed and operational but over budget and over the time estimate and offers fewer features and functions than originally specified.
3. ***Impaired*** - The project is cancelled at some point during the development cycle

The following diagram shows a simple model of solution success and failure.

[4] See ***The CHAOS Report 1994***:
https://www.standishgroup.com/sample_research_files/chaos_report_1994.pdf
There have been many comments on this and subsequent reports questioning their categorisation of project success and failure and the calculation of the proportion of projects that fall into each category. For example, see:
- ***How Large Are Software Cost Overruns? A Review of the 1994 CHAOS Report*** - http://www.umsl.edu/~sauterv/analysis/Standish/standish-IST.pdf
- ***The Rise and Fall of the Chaos Report Figures*** - https://www.cs.vu.nl/~x/the_rise_and_fall_of_the_chaos_report_figures.pdf

However, for the purpose of this analysis, the Standish Group numbers are assumed to be valid.

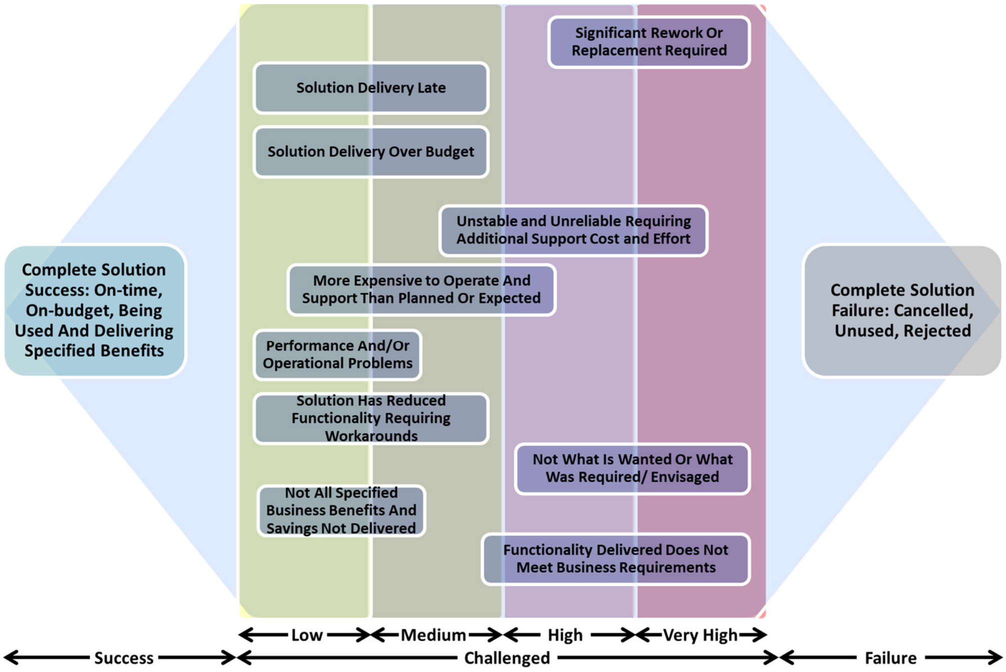
Complete Solution Success: On-time, On-budget, Being Used And Delivering Specified Benefits
Significant Rework Or Replacement Required
Solution Delivery Late
Solution Delivery Over Budget
Unstable and Unreliable Requiring Additional Support Cost and Effort
More Expensive to Operate And Support Than Planned Or Expected
Performance And/Or Operational Problems
Solution Has Reduced Functionality Requiring Workarounds
Not What Is Wanted Or What Was Required/ Envisaged
Not All Specified Business Benefits And Savings Not Delivered
Functionality Delivered Does Not Meet Business Requirements
Complete Solution Failure: Cancelled, Unused, Rejected
Low
Medium
High
Very High
Success
Challenged
Failure

Figure 34 – Field of Solution Delivery Project Success and Failure

These are not point reasons for solution delivery challenge or failure. Each of these reasons can occupy a band of impacts of just how challenged the delivery was from Low to Very High.

The challenged solution delivery reasons are:

Challenge Reason	Likely Impact Range of Challenge	Description
Significant Rework Or Replacement Required	High to Very High	Elements of the solution as delivered need to be replaced or significantly reworked to operate as planned or needed.
Solution Delivery Late	Low to Medium	The solution exceeded its original budget.
Solution Delivery Over Budget	Low to Medium	The solution exceeded its schedule.
Unstable and Unreliable Requiring Additional Support Cost and Effort	Medium to Very High	The solution does not work as automatically and without intervention as expected or designed or is unstable or unreliable and requires a degree of manual support work.
More Expensive to Operate And Support Than Planned Or Expected	Low to High	The solution works but the effort and cost to support and operate it is greater than planned.
Performance And/Or Operational Problems	Low to Medium	The solution does not have the required throughput or response times as expected or designed. The span of this challenge is generally low to medium but in extreme circumstances, the impact can be high.
Solution Has Reduced Functionality Requiring Workarounds	Low to Medium	Some of the initially designed functionality was omitted from the delivered solution requiring additional manual effort and work outside the core solution components.
Not What Is Wanted Or What Was Required/ Envisaged	High to Very High	The delivered solution is not what the business wanted or expected or does not fulfil their needs.

Not All Specified Business Benefits And Savings Not Delivered	Low to Medium	Some of the expected benefits have not been realised.
Functionality Delivered Does Not Meet Business Requirements	Medium to Very High	Some of the functionality contained in the solution does not work exactly as the solution consumer expected or wanted.

Table 9 – Field of Solution Delivery Project Success and Failure

At its simplest, the challenged domain includes solutions that are characterised by ***less*** for ***more*** of:

- ***Cost More*** – the original budget was exceeded or other unanticipated costs arose
- ***More Time*** – the original schedule was exceeded which means the business were late in having access to the solution
- ***Delivered Less*** – the original scope was reduced, making the solution less usable or requiring additional unplanned for effort or the solution takes longer to use or the solution does not meet the expectations of the target solution consumers
- ***Achieved Less*** – the solution does not deliver the expected benefits and savings or the solution is less widely used that expected or planned

Lost functionality is only really an issue if its absence leads to a problem in terms of work not done or work done elsewhere that takes more time or costs most. Loss of unnecessary functionality is not a problem. This relates to unnecessary solution complexity described in section 4.2.2 on page 101.

So-called challenged projects can be characterised as delivering ***less*** – less functionality, fewer benefits, less usability, less usefulness – ***for more*** – more time and more money. The degree of the combination of how much less for how much more can be regarded as the total operational solution deficit.

There is no easy formula to determine the total solution deficit, such as:

$$\left(1-\frac{(Planned\ Cost\ and\ Time - Achieved\ Cost\ and\ Time\ )}{Planned\ Cost\ and\ Time}\right) x\ Cost\ and\ Time\ Weight$$
$$+$$
$$\left(1-\frac{Planned\ Functionality\ Benefits\ Usage - Achieved\ Functionality\ Benefits\ Usage)}{Planned\ Functionality\ Benefits\ Usage}\right)\ x\ Functionality\ Benefits\ Usage\ Weight$$

Such attempts at creating an arithmetic of solution delivery failure are, at best, superficial and simplistic.

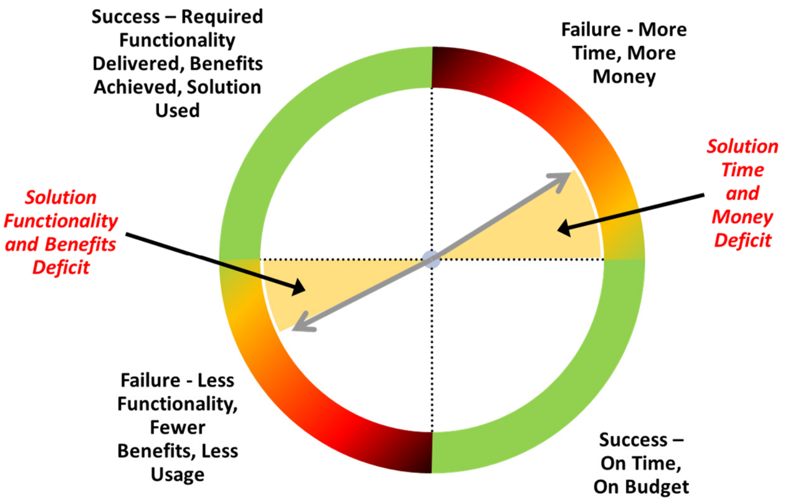
Success – Required Functionality Delivered, Benefits Achieved, Solution Used
Failure - More Time, More Money
Solution Time and Money Deficit
Solution Functionality and Benefits Deficit
Failure - Less Functionality, Fewer Benefits, Less Usage
Success – On Time, On Budget

Figure 35 – Operational Solution Deficit – Degrees of Less for More

These ***less for more*** factors overlap. If the delivery of the solution took longer, this will mean that the solution delivery team were working longer incurring more cost than budgets. If the solution delivered less and thus either did not generate the expected savings or benefits (see section 4.11.1 on page 382) or required manual workarounds or both this would also increase the effective solution delivery and operations cost.

So, solution delivery success means avoiding these ***less for more*** characteristics. One way this can be achieved is to know as much as possible of what is needed up-front, so the real effort, time and cost can be quantified.

Since the original Standish Group CHAOS report, there have been several follow-up Standish reports[5], each reporting different levels of project success, challenge or impairment. The following summarises the results of their analyses from 1994 to 2015.

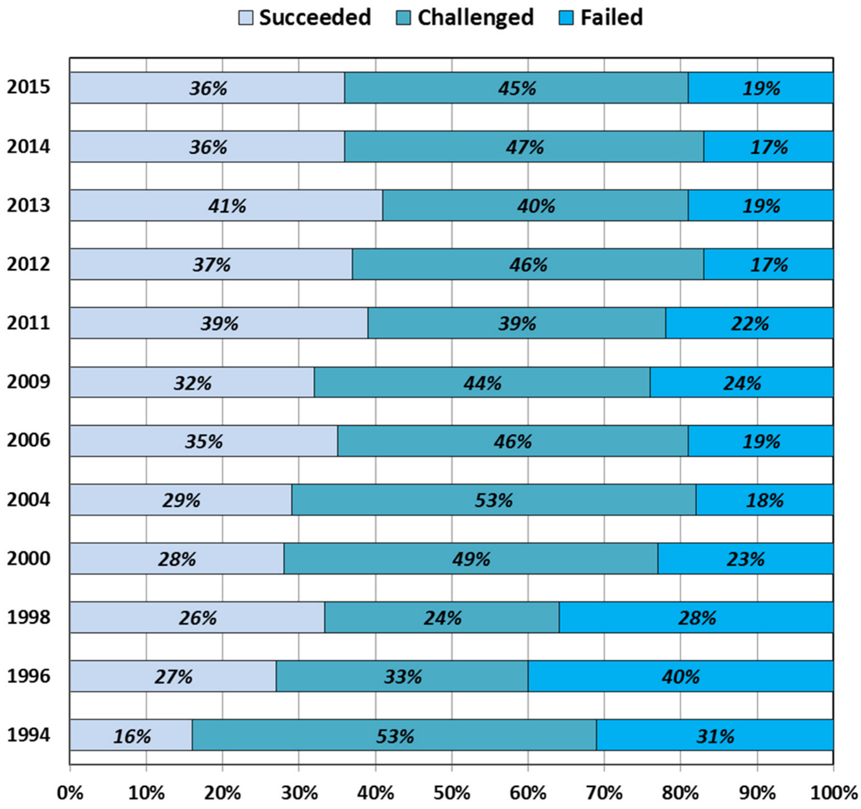

Figure 36 – Standish Group CHAOS Report Project Outcome Results 1994-2015

The data in the chart is:

Year	Succeeded	Challenged	Failed	Succeeded or Challenged
2015	36%	45%	19%	81%
2014	36%	47%	17%	83%
2013	41%	40%	19%	81%
2012	37%	46%	17%	83%
2011	39%	39%	22%	78%
2009	32%	44%	24%	76%
2006	35%	46%	19%	81%

[5] For example, see the CHAOS Report 2015: https://www.standishgroup.com/sample_research_files/CHAOSReport2015-Final.pdf

Year	Succeeded	Challenged	Failed	Succeeded or Challenged
2004	29%	53%	18%	82%
2000	28%	49%	23%	77%
1998	26%	24%	28%	50%
1996	27%	33%	40%	60%
1994	16%	53%	31%	69%

Table 10 – Standish Group CHAOS Report Project Outcome Results 1994-2015

According to these Standish Group figures, between 1994 and 2015, the relative proportions of projects that succeeded and those that failed have effectively been transposed. Successful projects increased in proportion from 16% to 36% while failed projects fell from 31% to 19%.

The information from the Standish Group is presented here without detailed analysis. This is beyond the scope of this book. It is not clear if project success is assessed against the original project timescale, budget and functionality or against a replanned project with the original scope having been changed.

Also, the degree by which a project is challenged can be very small or very large due to one of more factors with varying degrees of severity as discussed above.

There have been other more recent analyses of project failure that generate similar outcomes[6]. The analysis by Brenda in 1999 Whittaker was based on a survey of 176 projects in Canada. It defined project failure as:

> *Project failure was defined in three ways: overrunning its budget by 30 per cent or more; overrunning its schedule by 30 per cent or more; or failing to demonstrate the planned benefits. Of these, failure by overrunning schedule was by far the most common. A total of 87 per cent of failed projects exceeded their initial schedule estimates by 30 per cent or more. This compares to 56 per cent of failed projects that exceeded their estimated budget by the same amount, and 45 per cent of failed projects which failed to produce the expected benefits*

It identified a hierarchy of project failure causes based on three core sets of reasons:

1. Poor project planning
2. A weak business case
3. Lack of senior management involvement and support

The following table summarises the hierarchy of causes identified in this paper:

Component Type	Description	Description
Poor project planning (specifically, risks were not addressed or the project plan was weak).	Risks were not addressed as part of the project planning process.	Slippage from the schedule
		Change in scope of technology, functionality or business case
		Cost overruns associated with one or more project components
		Change in any key individuals such as the business sponsor, project manager or vendor manager
	The plan was weak	Incorrectly estimated activity durations

[6] For some examples, see:

- ***Lessons for IT Project Manager Efficacy: A Review of the Literature Associated with Project Success*** Chuck Millhollan, Michelle Kaarst-Brown - https://journals.sagepub.com/doi/abs/10.1177/875697281604700507?journalCode=pmxa
- ***What went wrong? Unsuccessful information technology projects*** Brenda Whittaker (1999) Information Management & Computer Security. Vol. 7, No. 1 pp. 23-29. http://cs.mvnu.edu/twiki/pub/Main/SoftwareEngineering2010/What_went_wrong.pdf
- ***Six Reasons for Software Project Failure*** Barry Boehm, (2002) IEEE Software, September/October, pp. 97.

Component Type	Description	Description
		Incorrect assumptions regarding resource availability
		Inadequate assignment of activity accountabilities
		Missing or incomplete review and approval activities
The business case for the project was weak in several areas or missing several components	Business and operational changes needed to deliver the benefits	
	Clearly understood deliverables	
	Quantified costs and benefits	
	Overall scope of project	
A lack of management involvement and support.		
Custom-developed applications were associated with serious budget and schedule overruns.		
Budget and schedule overruns	Risks were not addressed in several areas	
	The project manager did not have the required skills or expertise	
	Project progress was not monitored and corrective action was not initiated	
	The experience, authority and stature of the project manager were inconsistent with the nature, scope and risks of the project	

Table 11 – Causes of Project Failure from *What went wrong? Unsuccessful information technology projects*

The paper by Barry Boehm lists the following six reasons for project failure:

1. Incomplete requirements
2. Lack of user involvement
3. Lack of resources
4. Unrealistic expectations
5. Lack of executive support
6. Changing requirements and specifications

The more recent work by Alexander Budzier and Bent Flyvbjerg[7] of the BT Centre for Major Programme Management at the Saïd Business School in the University of Oxford[8] which has an academic rather than a commercial basis shows comparable results. This analysis differs from the Standish Group as it looks at variance from planned budget and schedule and analyses the proportion by which the actual varies from the initially planned or budgeted time or amount: (Actual Budget/Schedule – Forecast Budget/Schedule) Forecast Budget/Schedule.

> *Our first statistical approximation of the collected sample has shown that on average ICT projects perform reasonably well – +27% cost overrun, +55% schedule overrun in three out of four projects. Apart from the risk of getting the budget cut a very high risk exists that a project turns into a Black Swan. One in six projects (17%) with cost overruns of nearly +200% and schedule slippage of nearly 70%.*

The Budzier and Flyvbjerg analysis was produced in 2011. It states that 75% of projects experienced significant budget and schedule overruns. The Standish Group proportion of challenged projects for 2011 was just 39%.

The Budzier and Flyvbjerg analysis does not include details on the benefits shortfall of these projects that experienced cost and budget overruns.

[7] See:

- ***Double Whammy – How ICT Projects are Fooled by Randomness and Screwed by Political Intent*** - https://arxiv.org/ftp/arxiv/papers/1304/1304.4590.pdf
- ***Why Your IT Project May Be Riskier Than You Think*** - https://hbr.org/2011/09/why-your-it-project-may-be-riskier-than-you-think
- ***Quality Control and Due Diligence in Project Management: Getting Decisions Right by Taking the Outside View*** - https://arxiv.org/ftp/arxiv/papers/1302/1302.2544.pdf

[8] See:
https://www.sbs.ox.ac.uk/

The CHAOS reports include a top ten factors that they say can be used to assess the likelihood of the success or failure of a project. These factors have changed over time. Each of these success factors is assigned a score with the total summing to 100. Their weightings and titles have changed over time. I have grouped similar success factors over time in the following table and so any errors in this grouping are mine.

Success Factor	**1994**	**1999**	**2000**	**2015**
	Factor Importance Score			
User Involvement	19	20	16	15
Executive Management Support/ Executive Sponsorship	16	15	18	15
Emotional Maturity (Managing Expectations, Gaining Consensus)				15
Optimisation (Clarify Objective, Divide Larger Projects Into Multiple Smaller Projects)				15
Clear Statement of Requirements	15			
Firm Basic Requirements		5	6	
Clear Vision and Objectives/Clear Business Objectives	3	15	12	4
Proper Planning	11	5		
Reliable Estimates			5	
Realistic Expectations	10			
Smaller Project Milestones	9	10		
Minimised Scope			10	
Modest Execution				6
Standard Software Infrastructure			8	
Standard Architecture				8
Formal Methodology			6	
Agile Process				7
Competent Staff/Skilled Resources	8	5		10
Experienced Project Manager/Project Management Expertise		15	14	5
Ownership	6	5		
Hard-Working, Focused Staff	3			
Other		5	5	
Total Success Factor Score	**100**	**100**	**100**	**100**

Table 12 – Standish Group Project Success Factors Over Time

To assess the probability that the project will be a success, the project is scored with respect to the success factors. The higher the score, the greater will be the chance of success. The lower the score, the greater will be the chance of some of project failure.

According to the Standish Group, the two most important success factors that are common to all their analyses are:

- User Involvement
- Executive Management Support/ Executive Sponsorship

It is interesting to note that the design of the solution is not explicitly mentioned in any of these factors. It may be subsumed into those factors that related to requirements and objectives.

Other overlapping important success factors that have been assigned different names over time are:

- Emotional Maturity (Managing Expectations, Gaining Consensus)
- Optimisation (Clarify Objective, Divide Larger Projects Into Multiple Smaller Projects)
- Clear Statement of Requirements
- Proper Planning
- Realistic Expectations

- Smaller Project Milestones

The analyses performed by Budzier and Flyvbjerg identified seven organisational challenges (these are no scored) that exist before a project starts (what they call organisational a priori challenges) that are associated with troubled projects. These are:

Organisational Challenge	Scope of Impact
Political bias and ineffective project sponsorship	Business
Ineffective governance structure	Business, IT
Unclear goals and business cases and success criteria	Business
Competing and shifting criteria	Business
Lack of risk management	Governance, IT
Big Bang approaches	Business, IT
No user involvement	Business, IT

Table 13 – Budzier and Flyvbjerg Project Organisational Challenges

These studies all tend to focus on the narrow aspects of software projects rather than on the wider aspects of a complete solution encompassing all the components of the types listed in section 2.4.2, including but not limited to developed or acquired and customised software.

These also tend to focus on project management failures as the root cause of the project failure. They do not consider the wider aspects such as the incompleteness of the solution design targeted for delivery by the project or the fundamental undeliverability of the solution as a cause. They start with the assumption that the project has been given a fundamentally sound and deliverable solution design and scope and that it is the delivery that goes wrong.

Again, the fundamental issue of the implementability of the solution is not explicitly considered.

An effective solution architecture function and a good solution design process that produces detailed, high-quality solution designs and identifies the complete scope of the solution will address many of these challenges and increase the likelihood of successful solution delivery and use. Good solution design means being aware of all the options and selecting the most appropriate one subject to all constraints. It means avoiding all the conscious and unconscious biases that lead to bad solutions.

A solution design process that identifies the end-to-end scope of the solution means the solution delivery project starts with an awareness of the effort, risks, scope and costs involved. The following table summarises how a solution design process can maximise the Standish Group solution delivery success factors. Again, I have grouped similar success factors.

Success Factor	Solution Design Contribution
User Involvement	A comprehensive solution design with all the scope elements identified will require user engagement. An effective user engagement process (such as those identified in section 4.6 on page 162) will both gather information and get the target business users involved. The business will contribute to the solution design and be able to see and understand the real solution scope. This will allow informed decisions to be made on what must be included and what can be excluded or deferred.
Executive Management Support/ Executive Sponsorship	A solution engagement process will demonstrate management support for the solution. Detailed knowledge of the real project scope will allow management to understand what they are sponsoring and to decide if the project is worthwhile.
Emotional Maturity (Managing Expectations, Gaining Consensus)	Knowing the full and realistic extent of the project, derived from the solution design, will allow expectations on what can be delivered and what is involved in getting an operational solution to be managed.
Optimisation (Clarify Objective, Divide Larger Projects Into Multiple Smaller Projects)	Knowing the components of the entire solution will allow their delivery to be allocated to different solution delivery stages or separate delivery projects by decision grounded in facts.
Clear Statement of Requirements	The engagement process will both define requirements and embed these in the

Success Factor	Solution Design Contribution
Firm Basic Requirements	context of a complete solution. The requirements and their delivery are shown together. The entire solution can be seen and understood.
Clear Vision and Objectives/Clear Business Objectives	
Proper Planning	Knowing the actual scope of the required full solution means that a plan to achieve that includes all elements it can be developed. Evidence-based decisions can then be made on the sequencing of solution delivery activities and the exclusion or postponement of components.
Reliable Estimates	
Realistic Expectations	
Smaller Project Milestones	
Minimised Scope	
Modest Execution	
Standard Software Infrastructure	The solution design will identify the components of the solution, including the software components, either acquired and configured/customised or developed. This will provide full visibility on what is required. These components can be delivered using standard components where they are available within the organisation's enterprise architecture or where they can be acquired.
Standard Architecture	
Formal Methodology	
Agile Process	
Competent Staff/Skilled Resources	
Experienced Project Manager/Project Management Expertise	A good project manager will seek to understand the full scope of the solution in order to create a realistic and achievable delivery plan that includes the necessary time, budget and resources. The project manager can then make rational decisions on phasing and scoping.
Ownership	
Hard-Working, Focused Staff	
Other	

Table 14 – Solution Architecture Contribution to the Standish Group Solution Delivery Success Factors

The following table summarises how a solution design process can address the organisational challenges expressed by Budzier and Flyvbjerg.

Organisational Challenge	Solution Design Contribution
Political bias and ineffective project sponsorship	An effective and working solution design process should allow informed solution delivery sponsorship because the sponsors will have greater confidence in the deliverability of the solution.
Ineffective governance structure	Knowing the actual and required scope of the solution should allow the required governance to be defined and put in place.
Unclear goals and business cases and success criteria	The solution design engagement process will clarify the solution goals and link business objectives to solution components. The engagement process will involve the business users so they understand the solution design process and participate in the solution design process.
Competing and shifting criteria	An honest and complete solution design will present the business with what is needed to achieve the required aims.
Lack of risk management	A comprehensive solution design will allow risks to be identified and mitigating and circumventing actions taken.
Big Bang approaches	Knowing the actual scope of the required full solution means that a plan to achieve that includes all elements it can be developed. Evidence-based decisions can then be made on the sequencing and phasing of solution delivery activities and the exclusion or postponement of components. Knowledge-based actions can be performed on what to do to balance delivery.
No user involvement	A comprehensive solution design with all the scope elements identified will require user engagement. An effective user engagement process (such as those identified in section 4.6 on page 162) will both gather information and get the target business users involved. The business will contribute to the solution design and be able to see and understand the real solution scope. This will allow informed decisions to be made on what must be included and what can be excluded or deferred.

Table 15 – Solution Architecture Contribution to Budzier and Flyvbjerg Organisational Challenges

Good solution design is not the answer to all project failures and challenges. It can only go so far. It cannot protect the organisation against other causes. Many of the reasons why solution delivery fails, either fully or partially, are due to circumstances such as organisation or individual cognitive or other biases and other influences such as groupthink. Good solution design cannot stop these. It may reduce their possibility or lessen their impact. Being aware of these biases and other influences can alleviate their consequences.

Some of the causes of poor organisation decision-making are:

- ***Cognitive Bias*** – Poor or inaccurate judgements, illogical interpretations and decisions, characterised by patterns of behaviour
- ***Strategic Misrepresentation*** – Deliberate misrepresentation in budgeting caused by distorted incentives
- ***Planning Fallacy*** – Systematic tendency to underestimate how long it will take to complete a task even when there is past experience of similar tasks over-running
- ***Optimism Bias*** – Systematic tendency to be overly optimistic about the outcome of actions
- ***Focalism*** – Systematic tendency to become inwardly focussed and to lose situational awareness and appreciation of wider context and display characteristics of cognitive tunnelling during times of stress
- ***Groupthink*** – The need for agreement, accord and compliance within the group results in a flawed, illogical and inhibited decision-making processes and decisions

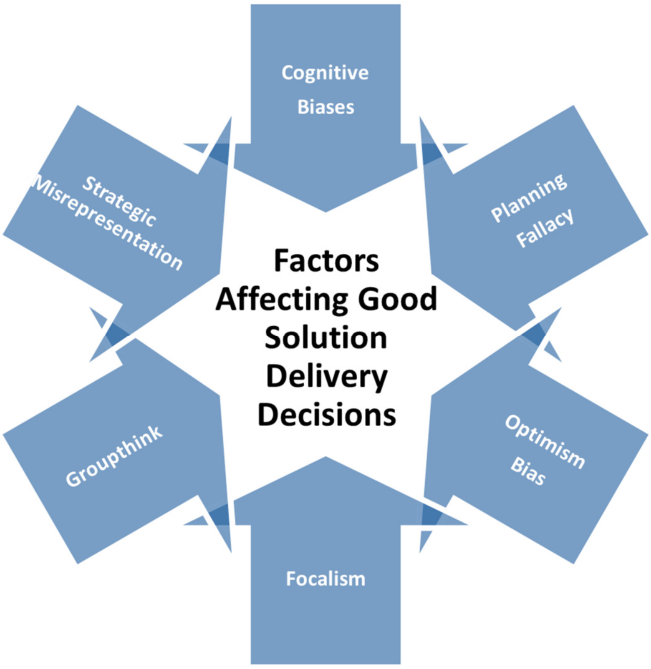
Cognitive Biases
Planning Fallacy
Optimism Bias
Focalism
Groupthink
Strategic Misrepresentation
Factors Affecting Good Solution Delivery Decisions

Figure 37 – Factors Affecting Good Solution Delivery Decisions

These factors can manifest themselves at times of solution delivery stress where the delivery project is experiencing pressure and strain due to previous poor decisions.

There are many classifications and types of cognitive bias. They can be very difficult to avoid because of their embedded nature in people's personalities and their emotional and irrational basis. Cognitive biases are very real and can have damaging effects. They can be grouped in a number of categories:

- **Decision-Making and Behavioural Biases** - affecting belief formation and business decisions
- **Probability and Belief Biases** - affecting way in which information is gathered and assessed
- **Attributional Biases** - affecting the determination what was responsible for an event or action

Some of the common decision-making and behavioural biases include:

- ***Anchoring*** – Relying too heavily on one piece of information when making a decision
- ***Attention Bias*** – Assigning greater weight to apparently dominant factors
- ***Bandwagon*** – Believing things because many others, believe the same
- ***Blind Spot*** – Seeing oneself as less biased than others
- ***Confirmation Bias*** – Interpreting information so as to that confirms preconceptions
- ***Exposure Effect*** – Greater preferences just because of familiarity
- ***Focusing Effect*** – Placing too much importance on one aspect
- ***Hyperbolic Discounting*** – Strong preference for immediate payoffs relative to later ones
- ***Information Bias*** – Looking for information even when it cannot affect action
- ***Irrational Escalation*** – Justifying increased investment based on the cumulative prior investment despite new evidence suggesting that the decision was wrong
- ***Negativity Bias*** – Paying more attention and giving more weight to the negative rather than the positive
- ***Omission Bias*** – Viewing a harmful action as worse than an equally harmful omission or inaction
- ***Semmelweis Effect*** – Rejecting new evidence that contradicts an established paradigm
- ***Sunk Cost Effect*** – Assigning a higher value to disposal/loss compared with cost of acquisition
- ***Wishful Thinking*** – Making decisions based to what is pleasing to imagine instead basing decisions on evidence and rationality
- ***Zero-Risk Bias*** – Looking to reduce a small risk to zero rather than a greater reduction of a larger risk

Some of the common probability and belief biases include:

- ***Ambiguity Effect*** – Selecting an option for which the probability of a favourable outcome is known over an option for which the probability of a favourable outcome is unknown
- ***Attentional Bias*** – Failure to examine all possible outcomes when making a judgment
- ***Availability Cascade*** – Belief gaining plausibility through increasing repetition
- ***Clustering*** – Perceiving patterns where none exist
- ***Optimism Bias*** – Judging future events in a more positive light than is warranted by actual experience
- ***Ostrich Effect*** – Avoidance of risk or the negative by pretending they do not exist
- ***Overconfidence Effect*** – Excessive or inflated belief one's performance, ability
- ***Serial Position Effect*** – Assigning greater weight to initial or recent events more than subsequent or later events
- ***Subadditivity Effect*** – Assigning a lower probability to the whole than the probabilities of the parts
- ***Subjective Validation*** – Considering information to be correct if it has any personal meaning or significance
- ***Valence Effect*** – Overestimating the likelihood of positive rather than negative outcomes

Some the common attributional biases include:

- ***Dunning–Kruger Effect*** – Where skilled underrate their abilities and unskilled overrate their abilities
- ***False Consensus Effect*** – Overestimation of agreement
- ***System Justification*** – Defending the status quo

Strategic misrepresentation is the deliberate misrepresentation in planning and budgeting caused by issues such as distorted incentives. It is often a response to how organisations structure rewards and motivate individuals and groups. It is characterised by:

- Deliberately underestimating costs to gain acceptance with understanding that costs will increase
- Not willing to face reality of high costs
- Overstatement or understatement of requirements
- Inclusion of ideology into planning

The underlying rewards system and processes need to be redesigned to eliminate this.

Groupthink is the need for agreement, accord and compliance within the group. It results in a flawed, illogical and inhibited decision-making processes and decisions. It happens when the group becomes dominated by small number of or single individual who forces their beliefs on the group. There is a tendency for consensus and agreement and the desire to minimise contention which means alternatives are not fully evaluated. The group isolates itself from information on alternatives. Disagreement and dissent within the group are quashed or concealed through self-censorship

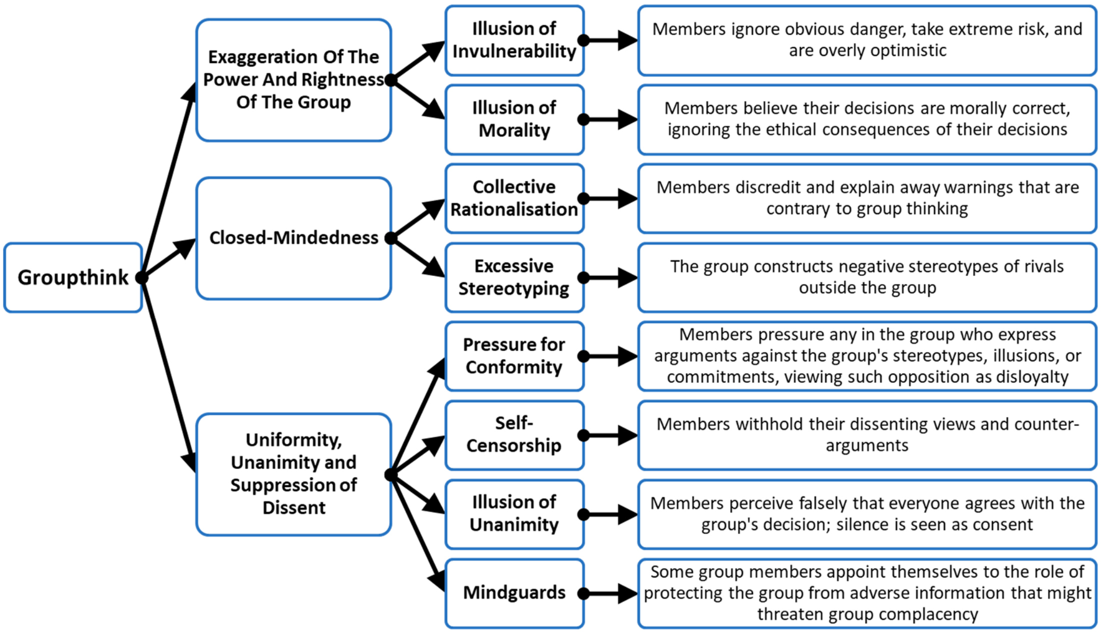
Groupthink
Exaggeration Of The Power And Rightness Of The Group
Illusion of Invulnerability
Members ignore obvious danger, take extreme risk, and are overly optimistic
Illusion of Morality
Members believe their decisions are morally correct, ignoring the ethical consequences of their decisions
Closed-Mindedness
Collective Rationalisation
Members discredit and explain away warnings that are contrary to group thinking
Excessive Stereotyping
The group constructs negative stereotypes of rivals outside the group
Uniformity, Unanimity and Suppression of Dissent
Pressure for Conformity
Members pressure any in the group who express arguments against the group's stereotypes, illusions, or commitments, viewing such opposition as disloyalty
Self-Censorship
Members withhold their dissenting views and counter-arguments
Illusion of Unanimity
Members perceive falsely that everyone agrees with the group's decision; silence is seen as consent
Mindguards
Some group members appoint themselves to the role of protecting the group from adverse information that might threaten group complacency

Figure 38 – Characteristics of Groupthink

Having written all of the above regarding the causes of solution delivery failures and challenges, there is one school of thought that states that this concern with and focus on delivering information technology solutions on time and on budget is wrong. It states that the more important objective is to deliver solutions that enable the organisation to transform its operations. Some organisations have excelled at transformation and at creating entire new industries. Information technology systems are of necessity new, untried and will involve trial-and-error to get right.

This provocative view is worth considering. But most solutions are delivered by more conventional organisations that have an existing set of operations and an existing heterogeneous information technology landscape that needs to be maintained and kept usable while new solutions are implemented. These organisations have limited resources that must be spent wisely. They have a limited capacity to handle change and so must select their changes carefully. They have a limited time in which to accomplish these changes. Finally, solution conception and design are the areas where new, untested and unproven ideas are explored. Solution delivery should be a more matter-of-fact and routine process unless, in the case of an agile approach, there is an element of discovery in this. Once the solution design is known, its implementation should have limited tentative, explorational and experimental characteristics unless it is a pure research and development initiative. Some of the underlying technologies may be new but this novelty can be allowed for. The complete solution is always much more than the sum of its pure technology components.

Solution delivery failure is at least partially a failure of understanding the actual scope of the solution and failure to put structures in place to achieve that delivery.

It is not really possible to create a plan to implement a solution if the complete scope of the work required in not known, understood and accepted.

Similarly, the best project management practices will not make a poor solution design implementable, operable, usable, supportable and maintainable. At best it will make the process for realising the deficiencies of the solution design and the need for their remediation slightly less painful and unpleasant.

3.1.1 The Business Value of Solution Architecture

The corollary to the previous section on solution delivery failure is what causes or influences solution delivery success.

The 2009 paper ***Business Value of Solution Architecture***[9] attempted to answer this question. The authors note:

> *In the literature, project management, analysis & design and software development and testing, attract a lot of attention and many methods and approaches have been devised for these activities.*
> …
> *None of these approaches recognizes explicitly the role of solution architecture, …*

The paper examined 49 custom software delivery projects. About half of the projects related to software being developed for companies in the financial sector. The remaining applied to other types such as industrial and public sector. There were a range of project types from transformation, merger and acquisition, single function integration and lifetime extension.

Some of the authors' key conclusions regarding the business benefits of solution architecture are:

> *The presence of an architecture governance process is significantly correlated with a lower expected value of budget overrun, compared to a situation where there is no architecture governance process in the customer's organization present. The difference in expected value is 19%.*
>
> *The presence of an architect during the calculation of the technical price is significantly correlated with a lower variance of the actual project budget, compared to a situation when there is no architect present during technical price calculation. The difference in the standard deviation of the project budget overrun percentage is 21% (13% versus 34%)*
>
> *The presence of a high-quality project architecture correlates with a decrease in time overrun of the project, compared to a situation where there is a medium or poor quality project architecture present. The difference in overrun is 55% (71% overrun versus 16% overrun).*
>
> *Usage of solution architecture is correlated with a significant increase in customer satisfaction.*

So, the involvement of high-quality solution architects in the solution design and delivery process resulted in:

1. 19% lower budget overspend

2. 21% small variance between actual and budgeted expenditure

3. 55% lower schedule overrun

4. Increased overall solution consumer satisfaction

The results of the analysis in this paper demonstrate that a high-performing solution architecture function can produce significant business value.

[9] Raymond Slot, Guido Dedene, and Rik Maes, https://onderzoek.hu.nl/~/media/sharepoint/Lectoraat%20Architectuur%20voor%20Digitale%20Informatiesystemen/2009/Business%20Value%20of%20Solution%20Architecture.pdf