

Using The QFD Blitz For Making Better Proposals

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Summary

Writing proposals is an important step for the success of a project delivered by an external supplier. It initiates the process of synchronizing the value chains between suppliers and customer.

Time schedule to submit a proposal is always critically short. When complex projects have short deadlines, this is an embarrassment for getting requirements right.

At Unisys, we established Proposal Centers to improve this process and adapted the QFD Blitz to proposal drafting and writing.

The results demonstrate

- better competitive position
- proposals that are easier to understand by the customer
- higher win rate
- reduced cycle time for proposal production

We are now working on improving the process and connect it to contract negotiation, software design and testing.

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Note: The authors got their experience mostly in software and in systems integration (SI) project environments. However, most of what follows is not only applicable to software or systems integration. Concerning proposal writing, SI proposals typically are of a high degree of complexity. There exist lots of opportunities for misunderstandings and other defects in interactions between supplier and potential customer. We will talk about *projects* and *proposals* and not refer to SI projects or SI proposals in particular.

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1. *The Demise Of Systems Integration Projects*

Undertaking large and complex projects, particularly in systems integration (SI), is similar to sea journeys in former times [for example *E. A. Poe*]. Many projects start by accident, not all concerned parties understand where to go, there is no agreement on the goals, communication is poor, and many of those projects never reach the destination harbor.

This is not only true for projects delivered by internal service supplier (such as large IT departments), but holds also for projects delivered by external suppliers.

1.1 *Why Projects Are So Seldom On Schedule*

1.1.1 *A typical Project Start (taken from real life)*

A typical project story read as follows:

1. After assessing the situation carefully, the customer decides that he wants to go for an external supplier and wants now to evaluate possible suppliers.

He underestimates time and effort needed to write a useful invitation to tender (ITT), because getting agreement on what exactly the requirements are is much more cumbersome than anticipated. He is late with regard to his original plans.

2. Therefore he releases the final version of his ITT late, say, just before year-end vacations start. He expects an answer within thirty calendar days, but because of the timing, and to allow time for mailing, only ten working days remain.
3. Now the supplier is under pressure to prepare a proposal despite the lack of time and unavailability of almost all needed experts.

However, he is prepared to step into the business and decides to tender anyway.

4. The ad-hoc bid team write the proposal during week end. Understandably, it lacks somewhat clarity and conciseness.

Still, the overall impression is favorable. The competition is not better anyway. Thus the customer starts negotiations with the supplier.

5. Some requirements were not well understood, and some services were not priced correctly. This makes the customer suspicious.
6. The procurement process of the customer is late because there are many open questions that need further investigation.
7. Because of those delays, the original plans offered in the proposal are no longer valid. Immediate problems require hasty solutions, corrupting plans furthermore.
8. Preliminary implementation work on the project starts without reviewed and approved specifications.

1.1.2 The Story Continues

I leave it to the reader to continue with their own experience. As a result, the project is likely to continue being late. Also, it will cost more than originally anticipated. It is difficult to restore a slippery project back to profitability and set it on target again.

The interesting question is, what impact bad proposals really have. Is the delay during the proposal process the root cause for all further problems? If not for all problems, for what kind of problems? When are defects detected in the proposal process, and by whom? Can they be fixed later? Were successful projects always based on good proposals? Are there projects that were doomed to failure already after the proposal has been accepted by the customer?

To answer such questions, we need to better understand the proposal and negotiation process.

1.2 Synchronization Of Value Chains

1.2.1 Supplier – Customer Relationship

In today's market, not only product characteristics count. In large and complex projects, process management is of decisive importance. The different features and characteristics of both the suppliers and the customer's value chain have impact on success or failure of projects.

The different value chains of supplier and customer do not readily fit together. In order to make projects successful, supplier and customer must synchronize their value chains in order to work together – at least temporarily, for the duration of the proposed project.

Synchronization of value chain includes

- Identifying suppliers and customers
- Definition of interfaces and common processes between supplier and customer
- Requirements identification and tracking
- Agreement on development methodology
- Agreement on delivery schedule
- Definition of input, output and controls, such as
 - project deliverables
 - project controls
 - escalation
- Acceptance test criteria and procedures

On the free marketplace, matching customer and supplier happens somehow during the acquisition process. Only public law, trade rules, state regulations apply. Within an ideal free market, the best offer in terms of quality, price and delivery wins. It is the responsibility of the customer to evaluate that supplier, whose value chain fits best to his own.

1.2.2 Internal Customers

If supplier and customer are within the same organization, or if the relationship is ruled by long-term contractual agreements, some provisions may already exist that support fitting of the value chains.

Instances of such synchronization could include basics such as the existence of a common dictionary, order forms or track records, common organizational settings such as regular meetings or a permanent steering committee. In more advanced environments, we may expect defined common processes between supplier and customer. Such rules specify input, output and controls.

1.2.3 Winning A Proposal

The proposal processes consist of much more than just proposal writing. Preparing the proposal document is just the finishing touch after the work done by consultants and sales people. They spent time and effort to understand the customer's needs and to draft a solution outline.

The proposal process itself can be a source for mistakes that may evolve into defects later. Not understanding the customer, not speaking his language, not be able to assess his requirements and his values may result in misunderstandings. As a result, the customer may choose another supplier, or – even worse – he may accept the proposal under false premises.

Various models exist that design an integrated value chain connecting sales activity to project delivery over various controls, checks and balances. One such example is the following bid process, as used by the Unisys corporation.

The arrows indicate information flow. Thin (gray) arrows indicate reviews, thick (red) arrows point to approvals:

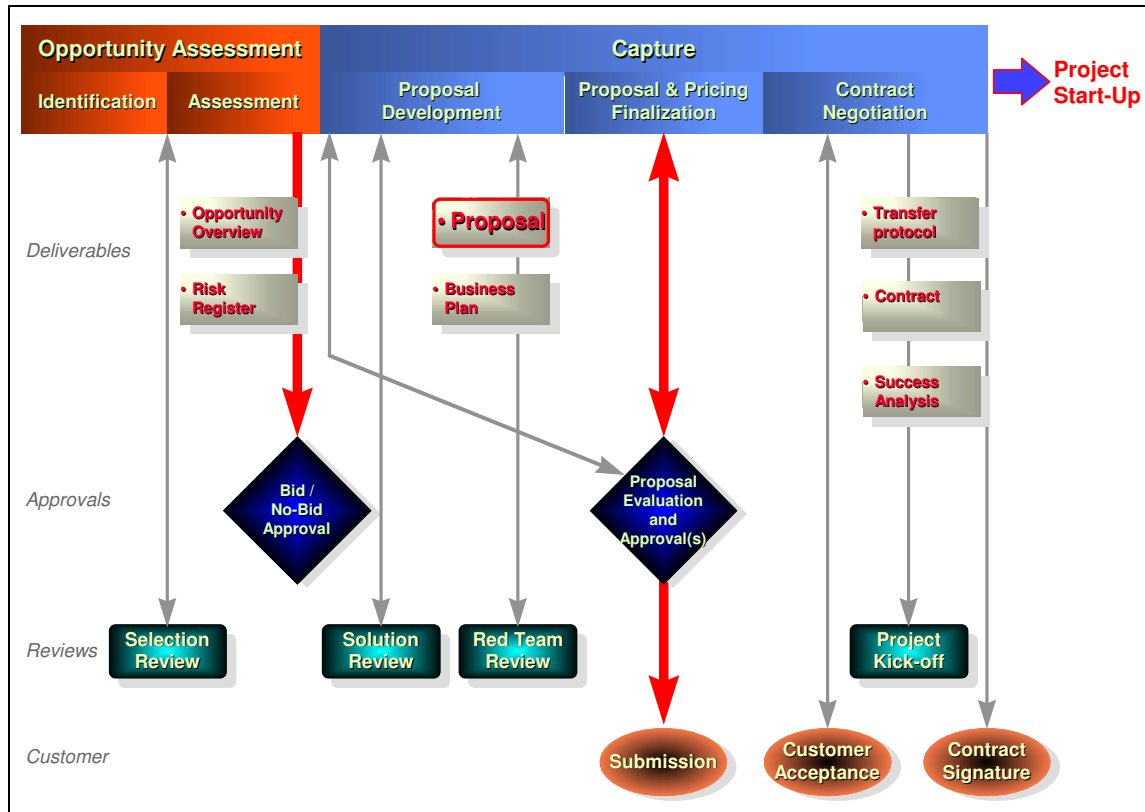


Figure 1: Process overview for winning a bid at Unisys Switzerland

Of course, the most disastrous failure of the proposal process is not leading to a win¹.

The failure may result from a defect in the supplier's opportunity qualification. Such a defect may make the supplier believe that his solution is better than the competition's, where the contrary is true. To handle that issue, the supplier conducts a selection review.

In other cases, the failure occurred in the proposal writing process itself. The proposal may have failed to deliberately explain the strengths of the supplier's solution. The customer who reads and assesses the proposal will then get a wrong perception of the proposed solution and may not completely understand the proposal. This is the main purpose of the solution review.

Another important failure occurs, when a supplier does not estimate his cost correctly. We address this issue with the "Red Team Review" (a peer review) and a two-stage management review and approval: first a review for the business plan and then the approval of the final offer.

Proposal writing is integrated in the overall bid process. If not removed in time, defects from earlier stages are carried over to the proposal writing sub-process.

¹ Sometimes proposals are written without the intention to win, but rather to mark market presence. In such cases, a loss is not a failure, but rather expected outcome of the task.

1.2.4 *Proven Ways Of Failure*

A good proposal cannot guarantee success for a project, but a bad proposal can actively destroy all chances to success. Proven ways of failure include for instance:

- Not identifying the customer
- Assuming requirements are known, clear and accurate
- Provoking false expectations
- Not identifying the strengths of the supplier
- Not taking the risks and chances into account
- Forget proposing the project organization
- Omit specifying the customer's task
- Not establishing change management processes
- Omitting acceptance criteria and procedures

If a proposal does fail in any of these ways of failure, we consider that as a defect of the proposal. Any ambiguity, misleading assumption or false claim in a proposal is also a defect.

If the customer accepts to enter into negotiations, then we get a chance to fix some of these proposal defects in the contract. Still, some defects will remain unnoticed and be carried over from the proposal into the contract.

1.2.5 *Failure Mode Propagation*

Preparing a proposal is just one step (possibly the first) of many steps needed to complete a project. In each step, mistakes can occur, can be removed within the step, or not detected and become defects later.

For instance, time constraints do not necessarily mean that a proposal is badly written or not well received by the customer. It may just increase the defect rate within the result and decrease the chances of fixing mistakes within a step before they become defects later.

Mistakes, Errors and Defects

A *Defect* is anything that has the potential to result in customer dissatisfaction over the life cycle of a product, system, solution or service.

An *Error* is a defect that escapes its development stage, but is found before passing to the customer

A *Mistake* is an error that is detected within its development stage

The following figure illustrates that behavior. Although we cannot know exactly how many defects are actually within the deliverables in each development stage, we can measure how many defects we have been able to find and to remove. These numbers are listed against the method used for defect detection.

With that data at hand, and knowing how well perform our defect detection methods, we can estimate the defect density that remains after approval in each of the deliverables. In a business application context, it is economically not feasible to adopt a zero-defect strategy. Thus remaining defects will exist and have some impact on future deliverables until they eventually become detected and removed.

Defects in the contract originate during proposal preparation, and may eventually be removed during contract negotiation. If defects remain in the contract, it may impact all later stages.

In this context, we interpret contract negotiation as a defect detection method similar to walkthroughs, formal inspections and tests.

The following illustration shows how defect propagation works in principle:

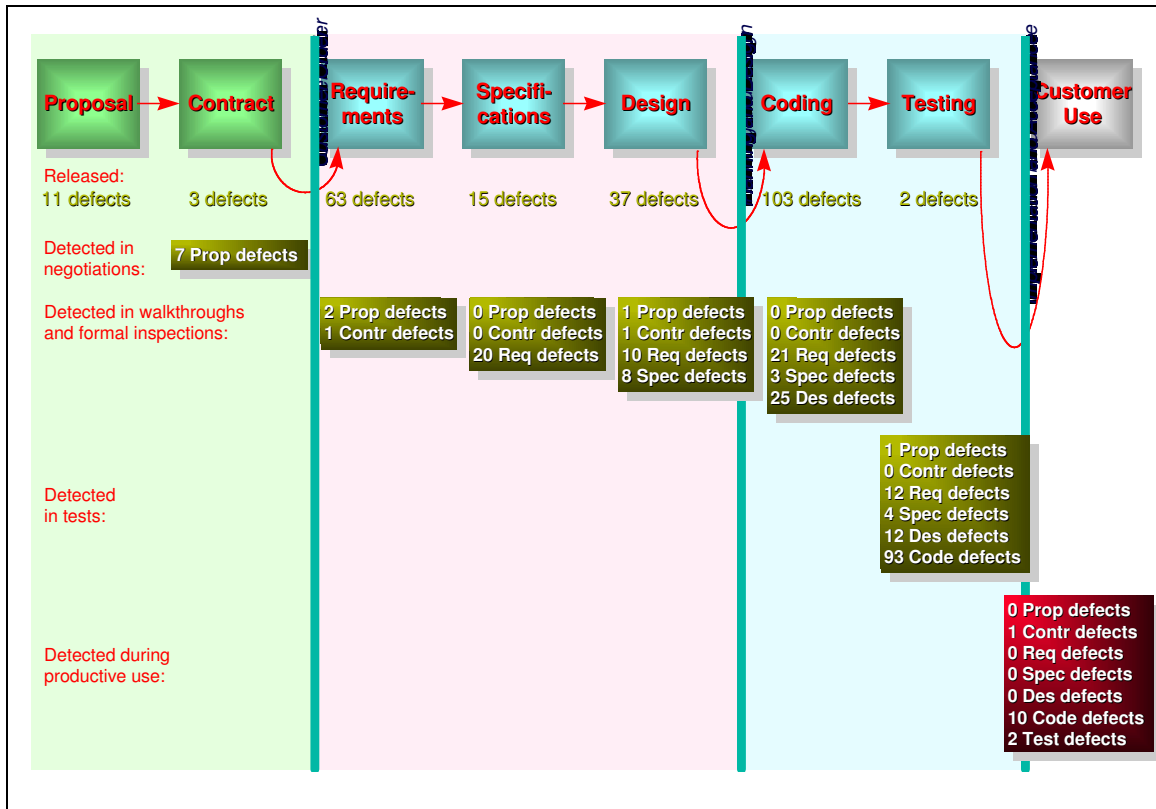


Figure 2: Failure mode propagation in software projects

Defects that escape the negotiation stages can become very expensive. Therefore we should measure the defect density in proposals and contracts.

Removing defects is considerably more expensive than fixing mistakes when they occur. There exist various investigations about how fast such cost increases occur, but they all agree that cost increases are over-exponential [*Managing the Software Process*].

Thus doing proposals right is a wise way of avoiding fixes at very high cost later. Investing in proposal process optimization and defect avoidance and removal is sound and we can expect a reasonable² return on investment.

² Investments in quality have a payback period of some few month.

1.3 Metrics

1.3.1 Customer Value

The metrics suited for measuring value chain integration are cost and benefit. We try always to express customer value in those terms. We express values either in absolute quantities ("may result in savings up to some amount of dollars within one year") or at least in relations ("benefit number two will have less impact on cost than benefit number one").

In order to make a comparison, it is important to translate all kind of effort into some cost equivalent. For internal effort, we apply standard cost rates.

1.3.2 Cost Of Solution

The same is true for the cost of the solution. The supplier's cost is easier to assess than the customer's internal cost, but any risk exposure has also to be taken into account.

1.3.3 Defects

It is not really hard to understand what a defect is, however it is hard to count them. The reason is, that defects occurring in a complex process are strongly interrelated.

It becomes even harder when we apply root cause analysis. Again, defects stem not from one root cause only, and one root cause may be responsible for many defects.

We help ourselves by strictly concentrating on customer perception. A defect is counted as one defect, if and only if it has the potential of adversely affect the customer. For instance, if a document contains spelling errors, we do not count those. We consider this one defect, because it has the potential of leaving the customer with the impression, that our document review process was not performing well enough.

2. The Proposal Writing Process

2.1 The Proposal Center

2.1.1 The Facilities

The Proposal Center consists of four meeting rooms well equipped with one large, full-size pin wall, several additional movable pin walls, flip charts, a central table and fast, networked PC workstations.

It is a security area that has its own separate computer network, with controlled access from other departments only.

The room equipment is a precondition for doing QFD, and they are also available for project teams during later stages in the value chain.

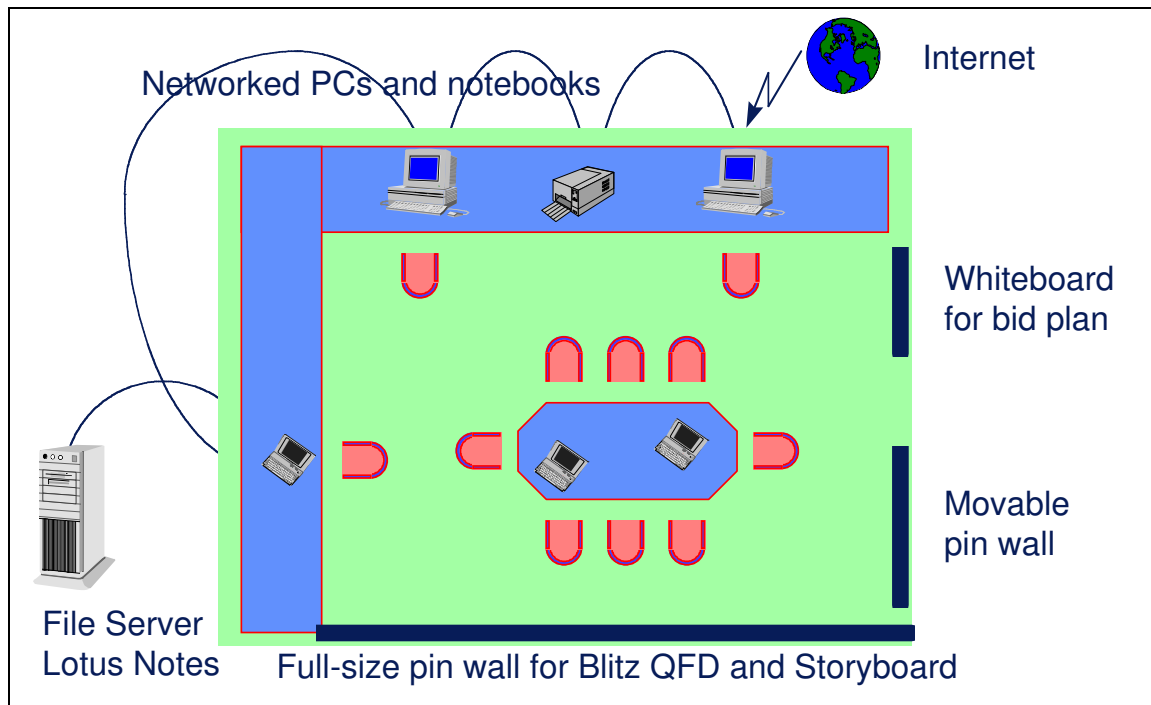


Figure 3: The Bid Rooms in the Proposal Center

2.1.2 The Proposal Team

The Swiss Proposal Team consists of three proposal coordinators and two staffs for bid administration and proposal production. We can produce small quantities of document copies with a high printing quality standard.

2.2 Planning The Bid

2.2.1 Teaming

Considering the short time usually left for completing a proposal, the initial meeting of the bid team is decisive for success.

Goal of the initial meeting is to introduce the members of the bid team to each other, and to clearly distinguish members from non-members (also for confidentiality reason). The bid team members exchange availability schedules, addresses and phone numbers. The bid manager defines roles and assigns tasks.

The proposal coordinator is responsible that the bid manager and the bid team understand its tasks and effectively start to plan the work. The coordinator is responsible for adapting the proposal process to the needs of this particular bid. The responsibility for the content of the proposal and for winning the bid remains with the bid manager.

2.2.2 Methodology, Scheduling And Tracking

We prepare a plan for each bid. We also plan for week-ends work and overtime as needed, as well as catering and overnight stay. Unplanned overtime is the prime metric for measuring the quality of the bid planning process.

2.2.3 Selection Of Bid Template

With the selection of the bid template, the bid team determines how the proposal will look like.

It is important to know who the reader will be. The layout and style depend from the customer's preferences, his corporate culture, corporate marketing style, customer document layout, and if our reader is a technical person or rather a business executive.

<i>Standard bid plan</i>	
Prepare proposal templates	
① Situation Analysis	
② Assessment of Risks & Chances	
③ Prepare Customer Value Table	
Prepare Storyboard	
Prepare Pricing Strategy (<i>Business Plan</i>)	
Draft proposal sections:	
1. Management Summary	
2. Unisys – your supplier	
3. Proposed solution for the project	
4. Proposed processes for the project	
5. Pricing	
6. Conditions	
7. References	
Draft proposal ready for review	
"Red Team" Review	
Improvements and corrections	
Ready for print	
Production	
Submit to customer	
Debriefing	

2.3 Risk Assessment and Win Strategy Deployment

The QFD Blitz is embedded in a process called "1-2-3 Win Strategy Deployment". The results of the process consist of three tables, the Situation Analysis with one column, the Risk & Chances affinity table with two columns and the Customer Value Table with three columns.

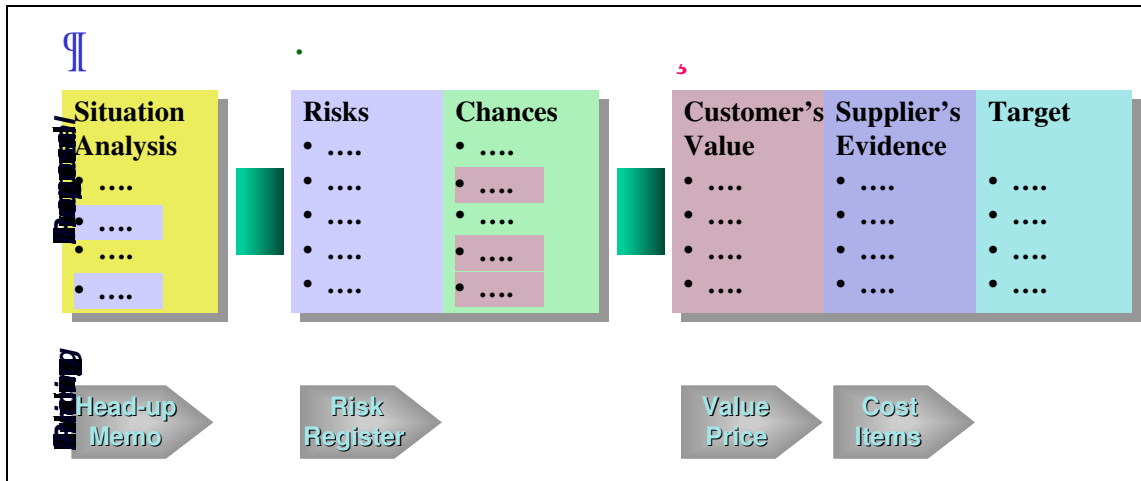


Figure 4: QFD Process Overview: 1-2-3 Win Strategy Deployment

The right side of each table contains input for the left side of the next table. Additional input must come from the participants' experience and from their customer knowledge.

2.3.1 Situation Analysis

The start with, the bid manager explains the situation to the bid team. The bid coordinator visualizes what has been said at the pin wall or on a flip chart.

2.3.2 Identifying Risks & Chances

Risk identification is not always easy. Risks always exist; the problem is to identify them and cope with them. Each identified risk constitutes a chance to distinguish our proposal from that of the competition. We group risks and chances on an affinity table. Thus the risk assessment is one of the most fruitful sources for the Blitz³.

2.3.3 Pricing Strategy

The results of these activities give valuable hints for the pricing strategy. With the Situation Analysis, we identify who must be involved in the business decision process. The "Risk Register" is a collection of identified risks and contingencies that must be considered for pricing. This is executed according the risk management methods set forth by the Unisys corporation. The Customer Value Table itself gives valuable information about the value of the proposal as perceived by the customer. Furthermore, the solution evidence we deem appropriate for persuading the customer constitutes a lower limit for cost reductions.

2.3.4 Objections

In some cases, there exist conflicting opinions within the customer's organization. We use another three-columns affinity table called "Objection Table" to deal with them, grouping conflicts with conflict resolution plans, and the plans with resulting additional customer value. This is another important source for the Customer Value Table.

2.4 The Customer Value Table (CVT)

2.4.1 Preparations

Because we deal with consultants, sales and not only with engineers, we do not display the full matrix but prepare a table with three columns labeled customer value, supplier's evidence and target.

In some sense, we concentrate on the diagonals of a minimum House Of Quality (HOQ). For these practical reasons, we can only deal with a limited number of value deployments outside the main diagonals.

³ It is one of the many puzzling facts in systems integration business, that customers do so seldom ask for risks associated to their project.

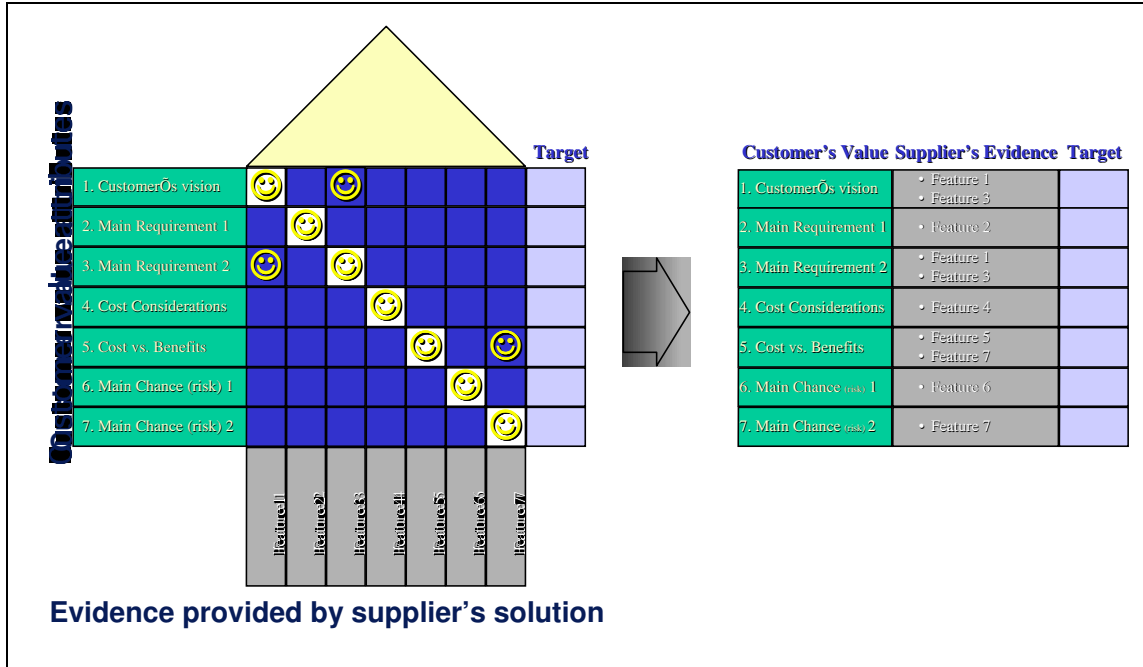


Figure 5: HOQ Reduction to Customer Value Table (CVT)

2.4.2 Who Is The Customer?

When writing a proposal, it is very important to know who the customer is. We must understand, that the customer of our proposal writing service is not limited to the customer of the proposed service or product. Indeed, the bid team itself is the primary customer and has some very important needs of its own to address in order to make the proposal a success.

Understanding, who the audience of the proposal is, yields a first group of customers. However, there are more customers. A proposal expresses needs and provokes expectations within a larger group of people than those who had the opportunity to read the original proposal document. Mistakes of that kind are a primary source for contract and specification defects later.

2.4.3 Collecting Attributes

The 1-2-3 Win Strategy Deployment and the Objection Table are the primary sources for the customer values. We use the information that consultants and relationship executives have gained from the customer.

Other sources are the customer's invitation to tender (ITT), or – if available – the requirements' specification. Any other document supplied by the customer can be helpful.

Customer supplied attributes in the ITT must be carefully assessed against

- completeness
- professionalism
- root cause
- intended consequences

- unintended consequences
- intended audience

In some cases, marketing data exists that can supplement the customer's voice. Also helpful is a SWOT–Analysis⁴ both for the customer as for the proposed solution.

The last information source is brain-storming in the bid team. This is not only helpful when other information is scarce, but also helps sharing knowledge effectively, so we always do brain storming for its team–building effects.

2.4.4 Weighting Attributes

Next we compare the results with the information obtained from the customer contacts and the documents. Then we rank according preference. Goal is to have seven plus or minus three customer value attributes.

The goal of the Proposal Blitz is not to design the solution in detail, but to win the proposal. We restrict ourselves to the seven plus or minus three most important attributes. On those we concentrate in the proposal. The rest may be of value later in the contract negotiation and in the specification process (and will thus be recorded as part of the proposal process track records).

The technique used varies. It may be moderation techniques such as grouping and then let the bid team distribute points to each attribute found, or more elaborate ones such as calculating the customers benefit and cost, based on metrics.

We list the customer attributes that best characterize the customer values in the Customer Value Table according preference.

Customer's Value	Supplier's Evidence	Target
1. Customer's vision		
2. Main Requirement 1		
3. Main Requirement 2		
4. Cost Considerations		
5. Cost vs. Benefits		
6. Main Chance (risk) 1		
7. Main Chance (risk) 2		

Figure 6: Selection of the seven customer's value attributes

⁴ Strengths – Weaknesses – Opportunities – Threads.

2.5 Evidence

2.5.1 Assessing Its Own Strength

The next step is to match the strength of the supplier's solution against the customer values.

We insist strongly on correct formulation of the strong points of the proposal. What we need, is not the demonstration of our belief in our strength, but evidence for it. Best case is when evidence is measurable. In previous version of the method, we used the term "metrics" for the second column. We still mention it when introducing the CVT to the bid team.

In reality, there is no one-to-one correspondence. In a matrix we would use weights to specify which feature of the solution supports which customer value best. Since we have only the diagonals of the matrix at our disposition, we cannot take weight into account.

At least, we can model the one-to-many relation between customer values and measurable evidence by mentioning features more than once when needed.

Thus we again restrict ourselves to the most important features of the solution. The goal is to highlight those major elements that the customer needs to assess our proposal against the competition, and not completely design our solution. This is the next step that we cannot start before we have the commitment of the customer.

2.5.2 Dealing With Weaknesses

There are weaknesses of the solution we want to offer. We consider known weaknesses as chances; unknown weaknesses are risks. We try to minimize risks and turn them into chances whenever possible. The CVT is very helpful in that respect, too. If there is no clear match to support a customer value attribute, then we are likely to have found an additional weakness of the solution approach.

In some cases, to gain this knowledge alone is worth all the effort we spend for proposal preparation.

The CVT now look as follows:

Customer's Value	Supplier's Evidence	Target
1. Customer's vision	<ul style="list-style-type: none"> • Feature 1 • Feature 3 	
2. Main Requirement 1	<ul style="list-style-type: none"> • Feature 2 	
3. Main Requirement 2	<ul style="list-style-type: none"> • Feature 1 • Feature 3 	
4. Cost Considerations	<ul style="list-style-type: none"> • Feature 4 	
5. Cost vs. Benefits	<ul style="list-style-type: none"> • Feature 5 • Feature 7 	
6. Main Chance (risk) 1	<ul style="list-style-type: none"> • Feature 6 	
7. Main Chance (risk) 2	<ul style="list-style-type: none"> • Feature 7 	

Figure 7: CVT after assessment of supplier's evidence

2.5.3 Completing The Blitz

The last step in the Blitz process follows quite naturally. We set targets for each of the important features needed for persuading the customer proposal. This also support the idea of measurable evidence, but has the additional value to set expectations for acceptance test criteria.

When done properly, this step will be helpful for test planning.

Customer's Value	Supplier's Evidence	Target
1. Customer's vision	<ul style="list-style-type: none"> • Feature 1 • Feature 3 	Target 1
2. Main Requirement 1	<ul style="list-style-type: none"> • Feature 2 	Target 2
3. Main Requirement 2	<ul style="list-style-type: none"> • Feature 1 • Feature 3 	Target 3
4. Cost Considerations	<ul style="list-style-type: none"> • Feature 4 	Target 4
5. Cost vs. Benefits	<ul style="list-style-type: none"> • Feature 5 • Feature 7 	Target 5
6. Main Chance (risk) 1	<ul style="list-style-type: none"> • Feature 6 	Target 6
7. Main Chance (risk) 2	<ul style="list-style-type: none"> • Feature 7 	Target 7

Figure 8: Final CVT

2.6 Drafting The Proposal

2.6.1 Storyboarding

An interesting variant of the QFD process is to proceed with integrated Storyboarding. The technique of Storyboarding for developing documents is well described elsewhere [*The Memory Jogger*].

The technique consists of visualizing the development steps for a document. We use our large pin walls for the purpose. All design, draft and review steps remain visible until the bid team finished the proposal. Everybody knows the actual state of the document with a glance at the pin wall.

In our case, we integrate the QFD Blitz into the management summary. We insert the table often as such. The small number of table cells needed in the Blitz allows us to insert enough context information.

An important aspect of the proposal center is, that the bid team remain in their reserved bid room during all the proposal preparation. This is their "war room", where they can work without interruption (shielded environment).

This allows for an additional benefit. The QFD Blitz remains at the wall during all the remaining proposal writing work. Because of the size and dominance of the pin wall in the room (it occupies one full room wall, large size), people study the QFD Blitz again and again. It helps the bid teams to keep clear focus, even during cumbersome and stressful systems configuration and subcontractor negotiations.

The result of this measure is excellent. We receive much of positive feedback. The notions used and the values defined in the Blitz flash up again and again in people's mind, at least as long as they stay in the bid room⁵.

2.6.2 Re-Using Similar Proposals

Naturally, we will not always start from scratch when developing a proposal. We keep a library of approved and reviewed text elements, including full chapters for description of common project processes related to project management, quality management, inspection and testing and final acceptance.

We have also the additional task of archiving all proposals done so far. This gives us excellent opportunity to reuse good solution elements.

However, there is a big caveat: Everything may be reusable, but not the CVT! We did it once, and promptly lost the bid. We do new CVTs even when proposing standard software solutions. Customer values are not reusable.

⁵ "Blitz" in German means *flash*.

2.6.3 *Highlighting Strengths*

The strength features listed in the second column of the CVT serve an additional purpose. We mark every reference to such a feature with a short side note. This makes a proposal easy to read, and helps the reader to locate the supplier's evidence throughout the text. This is another measure we adopt to anticipate the need to understand the proposal fast.

2.6.4 *Make It Easy To Understand*

Other measures are

- Insist on correct grammar and spelling
- Use a simple, non-technical style
- Clearly structure the text; do not allow for long sentences and paragraphs
- Spread pictures and visualizations regularly through the text
- Use standard text for identical sections (imagine the time savings this means for somebody who does not read a proposal from us for the first time).

Pictures also constitute a good place for important messages. Even the hurried reader notes them, he who often happens to be the decision maker anyway.

2.7 *The Review Process*

2.7.1 *Review Criteria*

According the bid process, we hold several reviews during the proposal writing. The "Read Team Review" normally takes place in the bid room, and is moderated by a member of the proposal team.

Review criteria come from the CVT. We assess the quality attribute: Do the customer values show up explicitly in the proposal? Are they understood? Is measurable evidence given for the feature of the proposed solution?

Again, it is very helpful, to have pin walls big enough to accommodate CVT and Storyboard.

2.7.2 *Corrections*

After review, a last correction allows for removal of all detected mistakes.

2.8 *Final Steps*

2.8.1 *Fine Tuning and Production*

This step consists of careful proofreading by peer reviewers who were not involved in proposal writing. Here, the CVT serves only for a short introduction in the topics of the proposal; focus is on grammar and spelling.

2.8.2 *Submission And Debriefing*

After submission, we ask the bid teams about their satisfaction as a customer of the Proposal Center. Then we conduct a short debriefing to learn about opportunities for improvement of the Proposal Center service.

2.8.3 *Tracking Results*

This is not yet where the proposal process ends. We need to know if we won against the competition. By help of the contract archive, we can track defect density at least up to project start.

3. *Achievements and problems*

3.1 *Better Hit Rate*

The Proposal Center in Switzerland opened in November 1996. Since then, the win rate exceeds all expectations.

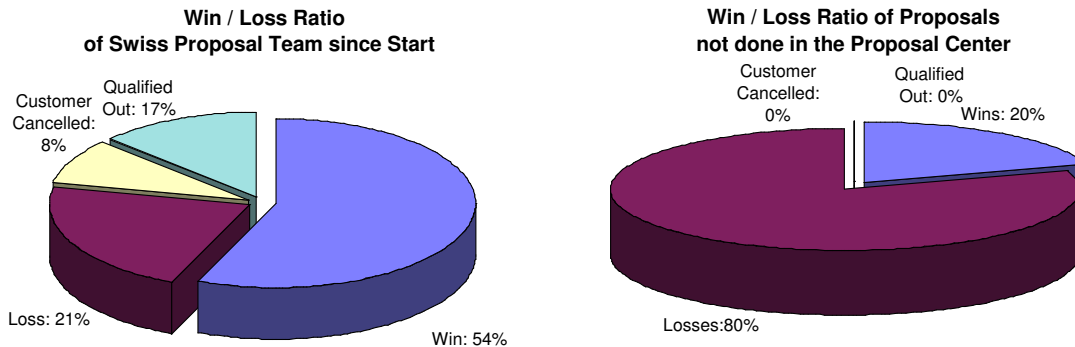


Figure 9: Hit Rate with and without Blitz QFD

3.2 *Faster Proposal Production*

A better hit rate is not the only benefit. We also measure overtime as a metric for process quality. If the proposal writing process is under control, we expect to do the work during normal working hours.

3.2.1 *Better Technology*

It is very important to have the right tools at hand. This also refers to computer equipment, but includes the room and pin wall facilities as well as continuous skill and process improvements.

3.2.2 *Structured Approach*

The most important aspect certainly is the structured approach to proposal writing. This helps to keep focus and saves time elsewhere needed for team organization and management.

4. Benefits Of QFD For Systems Integration

4.1 Designing A Full Process

The Proposal Blitz constitutes a step within a full QFD process for systems integration. On the project management level, the main components of the full process are tables. The directed data flow indicates deployment of quality attributes.

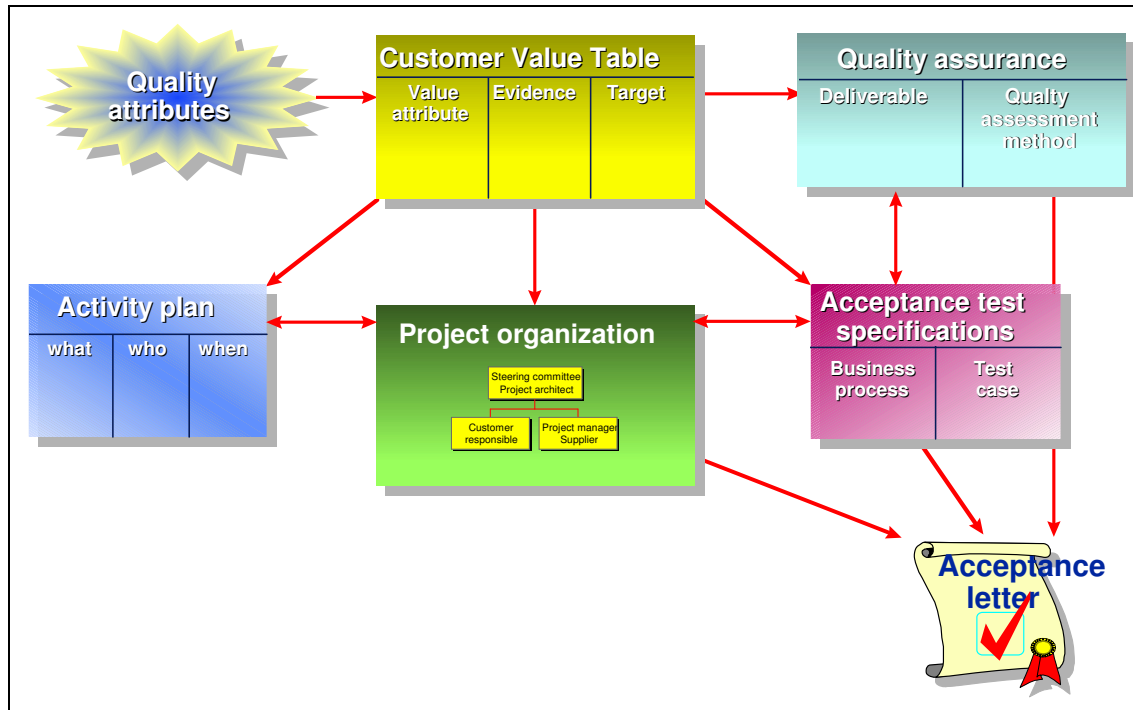


Figure 10: QFD systems integration process

In this integrated process, the arrows indicate knowledge transfer from one sub-process to the other. For instance, the project organization depends much from the solution features. Acceptance test depends from the targets in the CVT.

If the CVT is due to dominate the complete value chain, we need to invest the time and effort to do a full house of quality. We need to understand all the required features of our solution, and to find out anticipated needs. The customer must participate in such a QFD for full benefit.

The CVT used for proposal production can be a start, not more.

A possible sequence is:

- Customer value attributes deployment against solution features
- Solution features deployment against methods, to define the activities needed to build the solution.
- Customer values' deployment against project deliverables, to define the level of quality assessment needed.

- Solution features deployment against test cases, to design optimum test cases.
- Test cases' deployment against customer's business cases, to define optimum acceptance process.

We are currently in the process of defining an integrated value chain for systems integration [Richard E. Zultner, 1992].

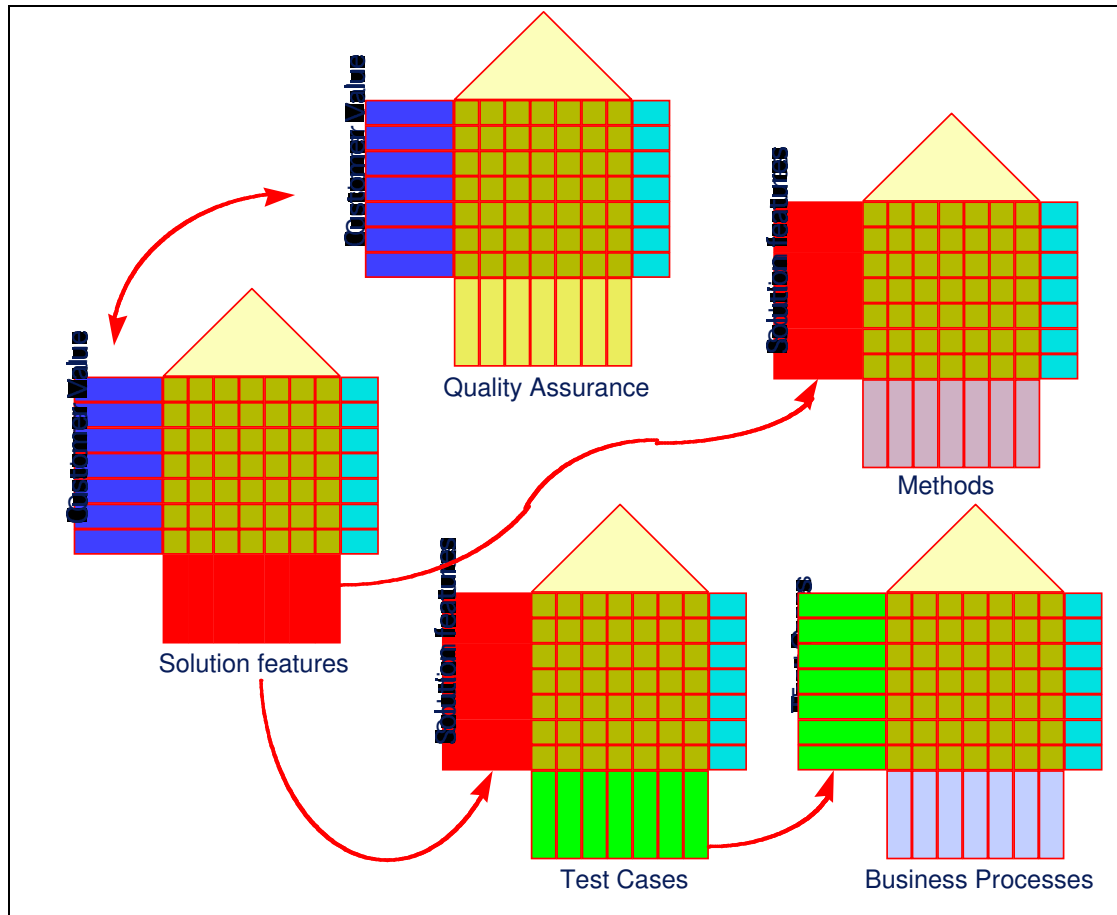


Figure 11: Integrated QFD in Systems Integration

4.2 Integrate QFD In The Value Chain

QFD must be integrated in the systems integration methodology. Contrary to the case for product development, there is little room for investments during product design stages. QFD is part of the project planning, specification and testing process, and must be integrated in the value and thus a service deliverable payable by the customer.

4.3 Integrate QFD In Testing

Another very promising application area is testing. As we have seen, targets used to define acceptance test criteria already appear in the initial proposal CVT. It is very natural to use a QFD matrix to find the optimum set of test cases to cover solution features.

5. Conclusions

We understand today, how software and systems integration projects could become much more predictable. Techniques like QFD, requirements engineering, selection of appropriate development methodology, CASE, testing are all known and ready to use.

According [*Business Week*], the favorable situation of US economics is largely due to information technology (IT). There is reason to believe that the economic slump in Europe is largely due to the regular demise of IT projects. As a result, European companies are excluded from taking advantage of the progress of information technology.

The saving potential in IT is tremendous. Realizing that potential alone would suffice to revert the actual economic downturn of West-European companies back to profitability and sustainable growth. IT is a key enabling technology for almost all kind of products and services.

An investigation conducted by the European Software Institute ESI shows, that average European IT managers are interested in applying new technology, but not in process improvement. However, successful process management is a precondition to use these new technologies successfully [*White Book" on SE Practices in Europe*].

Even a non-technical task like proposal writing can markedly improve success rates in an enterprise. Basically, we improve productivity by issuing better proposals with less bid cost leading to a higher hit rate. Giving the potential of QFD throughout the project life cycle, IT projects can become much better, but also much cheaper than they do now.

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