TRANSACTIONS FROM

International Symposium On QFD 2003-Orlando

THE FIFTEENTH SYMPOSIUM ON QUALITY FUNCTION DEPLOYMENT

December 12-13, 2003
Orlando, Florida

This collection of QFD papers and case studies is the companion document to **The Fifteenth North American Symposium on Quality Function Deployment** and **The Ninth International Symposium on Quality Function Deployment**, December 11-19, 2003 at the Courtyard by Marriott in the Walt Disney World Resort, Orlando, Florida, USA.

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ISBN 1-889477-15X

Quality Infrastructure Improvement: Using QFD to Manage Project Priorities and Project Management Resources

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Abstract

A common challenge for Information Technology (IT) departments is concentrating human resources where they can deliver the greatest benefit. Occasionally biases develop, where certain departments insist that their projects are more critical than others, and they demand that their projects be attended to immediately and that the most senior people be assigned to them. To better utilize IT department resources, projects should be prioritized based on their contributed benefit to internal and external customers, and staffing should be based on skill requirements.

National City has applied QFD to help in identifying and prioritizing the needs of their customers and evaluating each project based on its contributed benefit to meet these needs. Projects are subsequently assessed for it's the degree of complexity, helping IT department managers to assign resources appropriately. This paper will demonstrate how National City customized the QFD process through the QFD Green Belt® training of the QFD Institute. It will show how National City developed a list of internal customer needs, creating the criteria for determining project benefit, and then developed a separate set of criteria to judge project complexity and the required technical skills to work on the project. The paper includes charts and matrices defining this process. Upon completing this process, National City can now prioritize its internal IT projects and staff them with the most appropriate people, thus delivering the greatest value to National City's customers.

Key Words

QFD, Project Management, Information Technology, Project Selection

Introduction

National City Corporation (NYSE: NCC), headquartered in Cleveland, Ohio, is the nation's ninth largest financial institution. Operating through an extensive distribution network in Ohio, Illinois, Indiana, Kentucky, Michigan, and Pennsylvania, and in selected markets nationally, National City's primary businesses include commercial and retail banking, consumer finance, asset management, mortgage financing and servicing, and payment processing. National City employs more than 33,000 people.

Enterprise Production Services (EPS) is responsible for the availability, integrity and performance of National City's production systems across the enterprise. We are first and foremost a service organization that measures success in meeting or exceeding agreed upon service level commitments within our lines of business. The Process and Control department within EPS is responsible for managing internal IT improvement and remediation projects. Unlike most projects that deliver a new product or application upon completion, our internal IT projects deliver improvements or remediate an existing condition in the production environment. Our challenge is to deliver the projects that have the greatest benefit to our internal and external clients, while at the same time performing day-to-day production support activities.

Quality Function Deployment (QFD) is a Total Quality Management tool developed in the 1960s by Drs. Yoji Akao and Shigeru Mizuno to guarantee the quality of new products and services. Its primary principles include adopting a "design" approach, which means to begin at the highest order requirements and to systematically "deploy" downstream to critical details in the design, build, and delivery of the product. This method has been proved effective in software and IT project management applications as an empirical process for defining and prioritizing engineering activities. [Gorham et al]

QFD Process for Project Selection

With the absence of standardized prioritization across departments, projects have been assigned without consideration of other initiatives or relative project workloads. Repeatedly, key individuals became overloaded with projects from different managers, all carrying high priorities or no perceived benefits. This resulted in the individuals setting project priority, and a tendency to focus on project initiatives that enhanced their technical ability, and not necessarily the projects providing the highest benefit to the department and external NCC customer. To address this problem, the QFD Green Belt® course [QFD Institute] provided the basis for adapting the process to the needs of the IT department. By selecting criteria that aligned project benefits with the strategic direction of EPS, the department is now able to manage projects that help meet or exceed service level commitments with our lines of business.

Defining and Prioritizing Benefits

Internal customers are EPS managers, team leads, and the technical resources that support the various platforms across NCC, each having its own goals and priorities for maintaining production systems. External customers represent end users of system applications, both internal and external to NCC.

Since the need to determine the criteria that defined the relative importance of a project, we went to the *GEMBA* and interviewed technical personnel and managers. The feedback from the technical personnel revealed that they wanted to know the priority for each project, so that they could focus their time accordingly. An understanding of priorities would keep them from jumping from task to task, permitting them to focus on key tasks each week. On the other hand, managers wanted to know that prioritized projects were adding benefit to NCC.

Next we formed a stakeholders committee comprised of internal customers to maintain ownership of the project portfolio, prioritization, and status reporting for the initiative. The team was also responsible for canceling projects, resource management, and placing projects on hold when another initiative of higher priority was in contention with a strategic resource. A new process

called Quality Infrastructure Improvements (QII) was created to manage the data gathering, reporting, and prioritization for these projects.

The stakeholders committee's first task was to determine the benefits of the internal improvements and remediation initiatives to the internal and external customers. Since not all benefits have an equal impact on the company, the Analytic Hierarchy Process (AHP) was used to prioritize the benefits. With this method, the internal customer compares two benefits at a time, using a verbal scale from "equal" to "extremely more important." This method takes advantage of how people best make judgments, by considering two items and using a natural language ordinal scale. AHP then converts these ratings into numerical ratio scale priorities that accurately represent what matters most and by how much. See **Table 1**.

Table 1. Project benefits prioritized using AHP.

Criteria	IP Security, Regulatory, or Audit Requirement	Cost savings or cost avoidance	Replacing product end of life or support	Another project is dependant upon this initiative	Production issue	ZBD - Potential for production impact if not addressed timely	total	avg.
IP Security, Regulatory, or Audit Requirement	1	3	7	4	1/9	4	1.140	**0.190**
Cost savings or cost avoidance	1/3	1	7	1/5	1/9	1	0.435	**0.072**
Replacing product end of life or support	1/7	0.142857	1	1/7	1/9	1/3	0.150	**0.025**
Another project is dependant upon this initiative	1/4	5	7	1	1/5	3	0.887	**0.148**
Production issue	9	9	9	5	1	7	3.048	**0.508**
timely	1/4	1	3	0.3333	1/7	1	0.341	**0.057**
	10.976	19.143	34.000	10.676	1.676	16.333	6.000	1.000

This AHP ranking shows that projects that maintain the existing production environment should be addressed before other projects, whereas improvement and pro-active initiatives should be placed lower on the prioritization list. **Table 2** below explains the characteristic of the two highest-ranking project benefits.

Table 2. Project benefits criteria and characteristic.

Criteria	Characteristics
IP Security, Regulatory or Audit Requirements:	0 = N/A or None 2 = Requirement > 6 Months 5 = Requirement > 3 Months < 6 Months 9 = Urgent Requirement < 3 Months
Production issues:	0 = N/A or None 2 = Production Issue (Sev. 5) 5 = Production Issue (Sev. 3 or 4) 9 = Production Issue (Sev. 1 or 2)

Defining and Prioritizing Complexity

The next obstacle was to identify the best resource to "own" an initiative through its Project Life Cycle. The Stakeholder committee established three criteria that most influenced the effectiveness of a project owner to successfully complete an initiative. The three criteria are characteristics of complexity within the production environment and often play a major role in the success of a project. See **Table 3.**

Table 3. Project complexity criteria and characteristics.

Criteria	Characteristics
Technology exists in the environment	0 = Tuning / Analysis 2 = Minor Upgrade / Maintenance 5 = Major Upgrade or New Feature added to Current Technology 9 = New Technology in Environment
Technical Success Factors (Resource Constraints):	0 = Wide Range of NCC resources can complete 2 = Several NCC resources can complete 5 = Limited NCC resources, resource constraints or involvement by one team/group 9 = Outside Vendor will be engaged
Other IS involvement:	0 = Only EPS internal resources required 2 = Incidental involvement by other groups 5 = Multiple outside resources required (IP or STS) 9 = Multiple outside resources required (IP, STS, AIS, or Project Services) or extensive involvement by one group

Similar to the benefits, the relative degree of complexity was quantified using the AHP, as shown in **Table 4**.

Table 4. Project complexity quantified using AHP.

Criteria	Technology exists in current environment	Technical success factors / Resource Contraints	Initiative is driven by EPS personnel	1	2	3	total	avg.
Technology exists in current environment	**1.00**	**0.33**	**0.50**	0.167	0.182	0.143	0.491	**0.164**
Technical success factors / Resource Contraints	**3.00**	**1.00**	**2.00**	0.500	0.545	0.571	1.617	**0.539**
Initiative is driven by EPS personnel	**2.00**	**0.50**	**1.00**	0.333	0.273	0.286	0.892	**0.297**
	6.000	1.833	3.500	1.000	1.000	1.000	3.000	0.164

Benefits vs. Complexity

The allocation of a project owner is based both on the importance of the project (benefits to the company) and the complexity of the problem. A matrix was developed to better understand these relationships. See **Figure 1**.

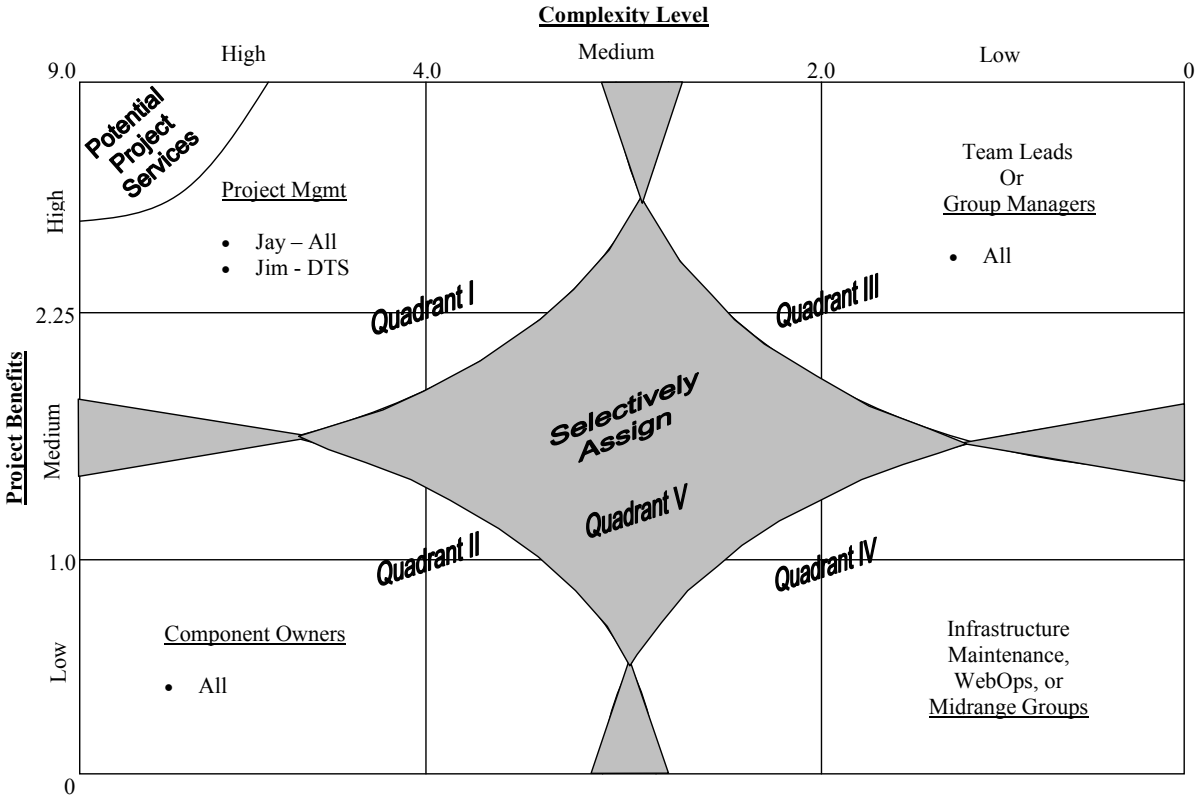

Figure 1. Project Benefits vs. Complexity.

Strategic Resource Allocation Guidelines

Following are the guidelines established for assigning a project owner to projects:

I. Project Management

- Characterized by Medium-High Benefits and Medium-High Complexity
- Projects are regarded as essential to EPS
- Projects mandate following project management methodologies to ensure on-time and on-budget completion
- The High Benefit and High Complexity nature of these projects require project-management focus

II. Component Owners

- Characterized by Low-Medium Benefits and Medium-High Complexity
- Normally small, short-term projects that require strong technical skills
- Component Owners will function as Technical Team Leads, since minimal integration is required
- Minimal project management knowledge is needed

III. Team Leads or Group Managers

- Characterized by Medium-High Benefits and Medium-Low Complexity
- Projects are typically process improvement efforts to support production
- Minimum integration across functional lines is necessary, which allows Team Leads and Group Managers to function as project managers
- Normally over short time frames

IV. Infrastructure Maintenance, WebOps, or Midrange Groups

- Characterized by Low-Medium Benefits and Low-Medium Complexity
- Projects are usually identified by technical experts, but executed by technical project coordinators
- May result in one project coordinator managing multiple small projects

V. Selectively Assign

- Projects lying on the boundary between multiple quadrants
- Require a better understanding of the project benefits, complexity, and existing resource constraints to properly assign the necessary resources
- As a result of above constraints, initiatives must be selectively assigned

Project Definition Form (PDF) and Scoring Projects across Departments

To manage the information gathered during the initial project definition, a Web form was created to simplify entry and tracking of new initiatives. The Project Definition Form (PDF) allows internal department users, as well as those from other divisions, to enter pre-defined criteria. The user completes a high level description of the project and information relating to the characteristic of the projects benefits and complexity. The PDF is then reviewed by all members of the QII committee for general understanding of the project and how it may impact their department and NCC. Each member then responds to an electronic survey that records scores for each benefit and complexity based on a 9-point scale. This information is tallied and reviewed at the weekly QII meeting to facilitate discussion and to score each benefit and complexity on a 9-point scale as a collaborative effort.

Prioritization of Projects based on Benefit and Complexity using a Matrix

The prioritized benefits and complexity is then entered into the columns of a matrix and the projects entered in the rows. The degree of benefit and complexity of each project are rated in the intersections using a 9-point scale. These rates are then multiplied by the priorities of each benefit and complexity, and separately added across to yield the absolute weights, which are then classified as High, Medium, or Low depending on their scores. A portion of the matrix is shown in **Table 5**.

Table 5. Matrix used to prioritize projects based on level of benefit and complexity (partial).

Project Owner Assigned	EPS Initiatives	Platform	IP Security, Regulatory, or Audit Requirement	Cost savings or cost avoidance	Replacing product end of life or support	Another project is dependant upon this initiative	Production issue	ZBD - Potential for production impact if not addressed timely	Absolute Weight	Priority	Technology exists in current environment	Technical success factors / Resource Contraints	Initiative is driven by EPS personnel	Absolute Weight	Complexity
	Benefit Weight		19%	7%	2%	15%	51%	6%			16%	54%	30%		
X	UPGRADE KAL-MAIN31 - SERVER HAS POOR RELIANCE	D	0	2	5	0	9	9	5.35	H	5	2	0	1.90	L
X	HIS MIGRATION	D	5	2	5	0	5	5	4.04	H	9	5	5	5.66	H
X	NOVELL FILE SHARING IMPROVEMENTS	D	0	2	9	0	5	9	3.42	H	2	5	5	4.51	H
X	HARDWARE/DASD CHALLENGED NETWARE SERVERS	D	0	5	9	0	5	5	3.41	H	2	2	2	2.00	L
X	WEBTRENDS SERVER UPGRADE	E	0	2	0	0	5	9	3.20	H	2	2	0	1.41	L
x	TSM ON NOVELL	D	0	2	0	0	5	5	2.97	H	5	5	2	4.11	H
X	UPGRADE NOVELL SERVER BLO-MAIN11 W/ COMPAQ	D	0	2	0	0	5	5	2.97	H	2	2	0	1.41	L
x	DOWN FOR MAINTENANCE SERVER	E	0	2	0	0	5	2	2.80	H	5	2	0	1.90	L

Next Steps

Projects are added into the QII process as the need arises. Currently five to six projects are added monthly. The Quality Infrastructure Improvements (QII) team reviews all projects through the electronic PDF and ranks the projects prior to the weekly meeting. During the meeting, new initiates are reviewed and ranked according to their defined *Benefits* and *Complexity*, and are assigned a project owner accordingly. The team also reviews the bi-weekly status report of all active projects to review milestone completions, budget, resource, and timeline constraints.

To keep the Project Prioritization matrix up-to-date with the strategic direction of NCC, the benefits and complexity will be reviewed periodically and re-weighted accordingly. This ensures that project prioritization and staffing align with the new goals and objectives of EPS and NCC. The QII team also plans to measure the success of the completed initiatives and examine initiatives that are not being completed. We then can make recommendations to management for additional resources to accomplish the lower-priority initiatives.

The QFD process has also been used in a Project Risk Initiation assessment. The assessment used QFD to gather risk factors for larger IT projects across NCC. Departments from Project Services, Engineering, Client Services, and Business consultanting gathered hundreds of risk factors. These factors were analyzed grouped into five categories and weighted using the AHP process. Next, each category was ranked to assign an overall "Project Initiation Risk Score," which will be used in conjunction with the Cost Benefit Analysis to help determine Project Portfolio selection. The Risk Assessment will also be used as a foundation for a risk mitigation plan when the project becomes active.

Conclusion

QFD has improved management of internal initiatives by prioritizing them by the benefits to EPS. As a result, the department is now able to identify the projects with the highest payback to NCC and is better able to assign appropriate resources to complete these initiatives within an acceptable time frame. Project management and technical resources are able to schedule their time more appropriately, and non-effective multitasking has been reduced. In the long run, a greater number of internal initiatives will be completed.

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Glenn Mazur has been disseminating and instructing QFD methods since their first introduction into the US in the mid-1980s. The founders of these methods recognized his work with the award of the Akao Prize® in 1998 and rating Mr. Mazur as a QFD Red Belts® (highest level) in 2000. His current positions: President of Japan Business Consultants, Ltd., Executive Director of the QFD Institute (volunteer) and International Council for QFD (volunteer), Chairman of the North American Symposia on QFD, and Faculty of TQM at the University of Michigan College of Engineering. Affiliations: Senior Member of American Society for Quality and Japan Society for Quality Control. Email: glenn@mazur.net