Title: Reengineering the Technical Enterprise

Course: EMGT 563
Term: Summer 1998
Year: 1998
Author(s): B. D. A. Sunardi, S. Roh

Report No: P98077

ETM OFFICE USE ONLY
Report No.: See Above
Type: Student Project
Note: This project is in the filing cabinet in the ETM department office.

Abstract: Based on a combination of real life experience on a "mini-reengineering" project in the International Products Department of TOP Corporation.

Reengineering the Technical Enterprise

A. Sunardi, B. Desmond, S. Roh

EMP-P98077

PC18077

Engineering Management 563/663

Reengineering the Technical Enterprise
Summer 1998

Analysis of Reengineering in the International Products Department Of TOP Corporation on

By
Andreas Sunardi
Bert Desmond
Seong Roh

August 7, 1998

Table of Contents

I. Introduction

This report is based on a combination of a real life experience on a "mini-reengineering" project and our teams ideas on how the reengineering project could be done better. For confidential reasons, a fictitious company name is used TOP, a large software Corporation. The reengineering occurred in TOP's International Products Department (IPD). ABS is the consulting team that helped IPD reengineer their processes. ABS stands for the initials of our team members.

The report has four main sections:

1. IPD before reengineering.
2. IPD after reengineering.
3. How IPD successfully reengineered.
4. Conclusions

II. IPD Before Reengineering

About IPD

TOP Software Corporation established in 1972 develops various software programs such as video conferencing telephone, network based communications tools, and office work related software.

IPD's charter is to take the U.S. developed products and convert them for international markets, primarily Asia and Europe. This requires translating software code, the user interface and documentation. IPD's manager was under enormous pressure, no matter how hard IPD worked they were always behind in schedule, quality and price. The TOP CEO informed the IPD manager that if things did not improve, the department would be eliminated. The IPD manager read about reengineering and engaged the ABS Consulting Team to help.

ABS Scopes the Situation

ABS interviewed employees, vendors and customers. Here are their important findings.

1. Customers said that IPD was late with weak solutions and high prices. There is no response to their complaints.
2. Employees are frustrated because they know the products are weak compared to competitors. They want to do a better job, but do not know how.
3. Competitors were more efficient, generating more revenue per employee, more profit, and faster development.
4. The IPD organization is strongly functional with little communications and trust between the functions.
5. When customers call or write, IPD does not respond, there is no customer interface.
6. Vendors are frustrated because they get unclear directions from IPD. This results in many revisions and delays.
7. The current process is complicated--many hand-offs between functions, time wasted.
8. IPD does projects as they come, accepting one even if it slows other projects.

ABS Presents to IPD Management

ABS presented the findings to IPD management at an off-site meeting, attended by the TOP CEO, Finance director, Marketing, Localization Engineering, QA Engineering, and

Publication Engineering. It was the first time that IPD management saw their organization and processes from a broad perspective. They developed a case for action with visions and goals.

Case for Action

We are disappointed with our current process. Our leading competitors can produce software more efficiently with higher quality and lower prices. Delays and complaints from our customers on our product quality have been our main concern.

In order to increase profit and competitiveness, we have to be able to produce high quality software in a short production cycle.

We have to focus on our customer needs and involve them in our process. To cut our costs, we have to shorten our production cycle, and increase our product quality.

IPD Vision

In two years, become the industry leader in quickly introdueing high quality, customer accepted, affordable products. Make customers and vendors partners in our development process.

IPD Goals

1. Reduce the production cycle from 240 days to 15 days for easy to intermediate software and 90 days for complicated software.
2. Delight customers so 99% of customers rate themselves as very satisfied
3. Bug reduced from 75% bug free to 99.9% bug free.
4. Increase profit margin from 5% of revenues to 30%.

Old IPD Organization

IPD had a traditional "smoke stack" organization where each function is separated from the others. Figure A-1 shows the IPD organization chart. Each function works hard at its assigned task and believes that any problems are caused by other functions. There is little trust and communications between each function.

Old IPD Process

Figure A-2 shows the old IPD decision flowchart. There three parts of the organization: Localization Engineering, Publications Engineering and Integration.

The left side of the flowchart shows the Localization Engineering tasks. The Localization Engineer localizes the code and subcontracts localizing the user interface to a vendor 500 miles away. When the code is translated and the user interface is complete, a Quality Assurance engineer tests them. If it passes the test, the next step is combining this with the publications.

The right side of the flowchart shows the Publication Engineering process. The Publication Engineer creates help and documentation files. When this is complete, Quality Assurance tests for acceptability.

The bottom of the flowchart shows where the code, help and documentation files are integrated. Again, QA checks this for acceptability before the final release. In most cases, the project passes when the localized product reaches this phase. If the project is unacceptable, either a Localization Engineer or a Publication Engineer fixes the critical defects.

The main job of Quality Assurance is to identify defects so others can fix them.

III. IPD After Reengineering

IPD reengineered their processes. The new IPD Decision Flowchart is shown in Figure A-3. Below is a description of the reengineered processes. These processes are continual reviewed for further improvement.

Description of Reengineered Process

IPD replaced its task-oriented focus to a customer oriented, team process. The reengineered process has the three essential parts, Triage, Collocated Teams, and Continual Process Improvement.

1) Triage of each potential project.
   a) Rapid development of high profit, winning projects.
   b) Careful selection of difficult, low profit projects.
2) Collocated temporary interdisciplinary teams.
   a) Lead customer involvement.
   b) Vendor involvement.
3) Continual process improvement.
   a) Employee cross-training.
   b) New product development.

1. Triage of Each Potential Project

After carefully analyzing their projects, IPD discovered that many of the projects could be done quicker with better communications and documentation. Approximately 10% of the projects slowed the whole process. By implementing a triage step before working on a new project IPD separated the "vital few" projects from the "trivial many".

1 a. Rapid development of high profit, winning projects.

IPD uses the triage process to separate the easy to do profitable projects from the time consuming, expensive projects. Figure A-3 shows this process. Proposed projects are reviewed in a weekly triage meeting attended by representatives from localization engineering, publications, and quality assurance; a vendor representative participates in the meeting via video conferencing. Triage has improved efficiency, product attractiveness, and speed.

The triage decision is made quickly in a ten-minute standup meeting where two minutes are allowed for each project. The group looks at each project and assigns it to one of two categories:

1. Easy to do and profitable.
2. Hard to do project may not be possible because of the difficulty of the task and the profitability of the potential project.

For the easy to do and profitable projects a new team is immediately created. People volunteer for the team after reviewing the Team/Project matrix posted on a large white-board visible to everyone. Figure 1 shows the Team/Project matrix. People often work on more than one project at a time.

A completion date is assigned to the project. Because doing easy projects is well documented and understood by everyone, the team can assign a date with confidence that it will not slip. Today, most easy projects are completed in four weeks compared with six months before reengineering.

Person	Project A	Project B	Project C	Project D	Project E
Completion Date	7/24/98	7/27/98	8/4/98	8/11/98	8/12/98
Paula Pubs	***		***		***
Peter Pubs		***		***	
Quinn QA	***	***	***	***	***
Luke LE		***			***
Laura LE	***		***	***	
Linda LE		***			***
Mary PM	***	***	***	***	***

Figure 1 White Board Team/Project Matrix
***** = Person is assigned to the project team**

1 b Careful selection of difficult, low profit projects

Rejected projects from triage, are evaluated by a multidisciplinary team which analyzes investment, potential sales, cost and time. This is a form of new product development because some of the rejected projects later become easy to do projects.

2. Collocated Temporary Interdisciplinary Teams

The old "smoke stack" organization is gone. In its place are tightly knit teams for each project. When a project is finished, the team is disbanded.

The team sits close together in a Japanese style "bull pen" arrangement. In the beginning, this was uncomfortable. Now, everyone realizes that with this arrangement projects are completed faster with better quality, lower cost and increased customer satisfaction.

The collocated teams eliminate the former information blockage and confusion. When problems occur, now teams say, "WE have a problem" not "THEY have a problem."

IPD uses enabling technologies in the reengineered process. In the triage meeting, vendors and a lead customer participate via videophone.

2 a. Lead customer involvement

In the old IPD system, many products were off the mark, late and costly. By directly including a lead customer, IPD gets immediate feedback about the customers' requirements. IPD created a pool of volunteer lead customers to help improve the process in return the lead customers get access to the latest product information.

IPD thought it would be difficult to recruit lead customers. However, they found a set of customers who wanted to help IPD to succeed. IPD flys lead customers to visit IPD once a year to gain the important information that comes with face-to-face communications.

This is win-win for IPD and lead customers.

2 b Vendor involvement

Each team has a vendor representative. Using the technology of video conferencing and e-mail, communications between the vendor and IPD is timely and clear. This speeds projects and decreases the vendor workload. Vendors love this involvement. Now, they clearly know what is required of them, there is no more rework. IPD learned that by including the vendor in the triage meeting and the development, the vendor's lead-time was cut from 15 days to 3 days.

3. Continual Process Improvement

IPD views reengineering as a continual process, with no end. Rather than focusing on creating the "best" process, they focus on continually improving all processes.

3 a Employee cross training

Team members are cross-trained so they can cover for the other. For example, a trained QA engineer can fix coding that was done by a localization engineer.

3 b New product development

The seeds for new product development are the projects rejected at triage. Each of these projects is carefully analyzed to measure its potential market size, development cost and customer attractiveness.

Currently, IPD engineers are working on ways to improve the current processes for developing the "easy-to-do" projects.

IV. How IPD Successfully Reengineered

This section describes how IPD applied the Nine Basic Building Blocks of Reengineering. This model has three points—Structure, Systems and Culture. Each point has three subpoints.

a) Structure

Process. Figure A-3 shows the new IPD process. The process uses triage to screen each project. Engineers do not work as functions, but as team responsible for the project from start to finish. Quality control now reduced to one step. The cross-functional process enables engineers to check the result and fix the problem directly without giving the result to QA Engineer and wait for the bug report.

IPD developed the triage criteria after carefully analyzing the existing process. They found that 85% of the projects were similar so they developed a documented process that greatly speeds product development time and lowers cost. Working with lead customers increases the probability that the product will be a winner.

Technology. IPD is using some new technology in their improved process. For example, videoconferencing establishes close communications with lead customers and vendors.

Organization. IPD dramatically transformed their organization. From a group of independent functions who rarely communicated today they are a tight knit interdisciplinary team focusing on customer needs.

b) Systems

Rewards. IPD uses team accomplishment as the basis for promotion and pay increases. This keeps the focus on results meaningful to customers rather than individual effort. One of the benefits of this is that it eliminates people who are not team players.

Measurements. Using the team/project white board (Figure 1), everyone can see at a glance the status of each project. Before, there was no accurate way to measure how each project was doing.

Management Methods. The triage process results in fast decisions fully supported by the IPD team. By involving all functions plus vendors and customers, the projects are completed much faster with higher quality and higher sales.

It doesn't show the status progress

c) Culture

Culture. IPD transformed its culture dramatically. Interdisciplinary teams are used for decision-making and projects. The IPD is now process-oriented and focuses on customer satisfaction.

Individual beliefs. The IPD people have changed their focus from one of, "how am I doing?" to "how are we doing?"

The new process requires the engineers to work as a team. Function specialty that makes the engineers believe that they are special and different from those in other functions, is now changed to integrated team where now they have to work together and share their skills.

Power. Decisions are no longer made at the top of the organization. Now the power to take on and staff projects is done by the people who know most about it—the IPD teams.

Resistance

Hammer says that the hardest part of reengineering is living through change. IPD knew that making this transformation would be difficult. Fear, resistance, and cynicism are inevitable. IPD overcame this resistance by applying the five key mechanisms for overcoming resistance described by Hammer: Incentives, Information, Intervention, Indoctrination and Involvement.

Incentives. Performance reviews and raises were based on the team's accomplishments in creating and satisfying customers. This meant that people had to change their mindset about performance reviews being based on individual performance.

IPD had negative incentives too. People who were uncomfortable or fighting the changes were first educated, but if they still resisted they were transferred to another department or they left the company.

Information. Franklin Roosevelt said, "The only thing we have to fear is fear itself." IPD focused on making decisions based on the facts, not opinions. ABS's findings in the initial survey were presented to all employees.

Intervention. There was much more emphasis on high quality one-on-one connections between the different functions. Now, everyone has the "big picture" and how each of the team members contribute to creating delighted customers.

Indoctrination. With the focus on continuing to delight customers, and the understanding that customer needs continually change, IPD team members know that change is an ongoing part of the job. Everyone must continue to learn, grow, follow and lead. IPD provides many training experiences for team members.

Involvement. The IPD team members were actively involved in redesigning their process. By sharing ABS's findings with the team members and having them lead reengineering the process, employees created their own systems. They were committed to the new systems.

IPD's new process required team members to learn and know more. QA engineers can now fix minor bugs. Training is provided to give the necessary skills and knowledge for the new process to the engineers. This action was not only prepared employees in the new process but also ensured them of their positions in the new process.

Inputs and suggestions were gathered to bring employee involvement and to eliminate fear of the unknown.

V. Conclusions

IPD gained many benefits from reengineering. Table 1 compares the before, goals and current performance on important measurements. Perhaps the most important improvement is the emphasis on continual improvement. IPD's accomplishments in reengineering have become the pilot study for all of TOPs to apply reengineering throughout the company.

	Before	Goals	Currently
Cycle Time Easy to do Projects	~180 days	15 days	30 days
Cycle Time difficult projects	~350 days	90 days	~60 days
Customer "Very Satisfied"	25%	99%	95%
Bug Free	75%	99.9%	97%
Profit Margin	5%	30%	20%
Vendor Cycle Time	15 days	N/A	3 days
Customer Involvement	None		On each projects
Average Profit per Projects	~2%		~10%

Table 1—Impact of Reengineering.

How was this measured? If you a team was in-volved

Appendix

TOP Software Corporation
International Product Department

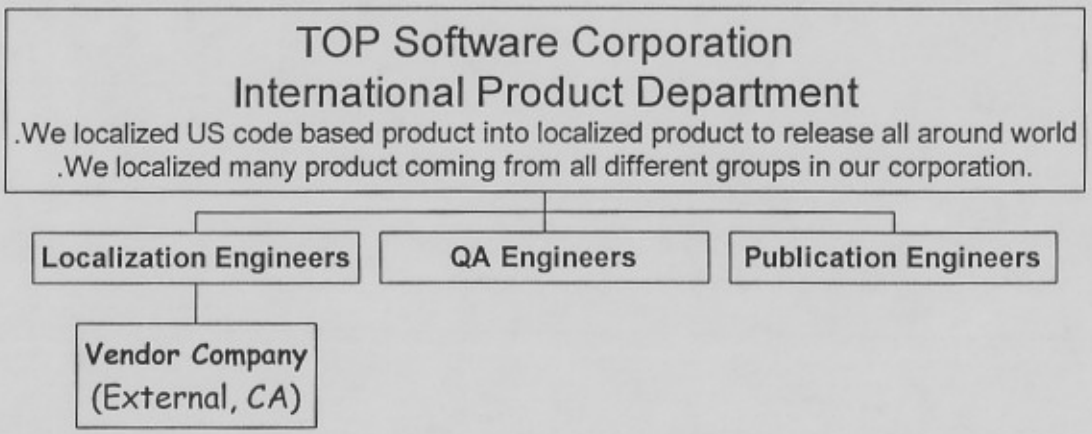


Figure A-1: IPD Organization Structure (before reengineering)

IPD DECISION FLOWCHART

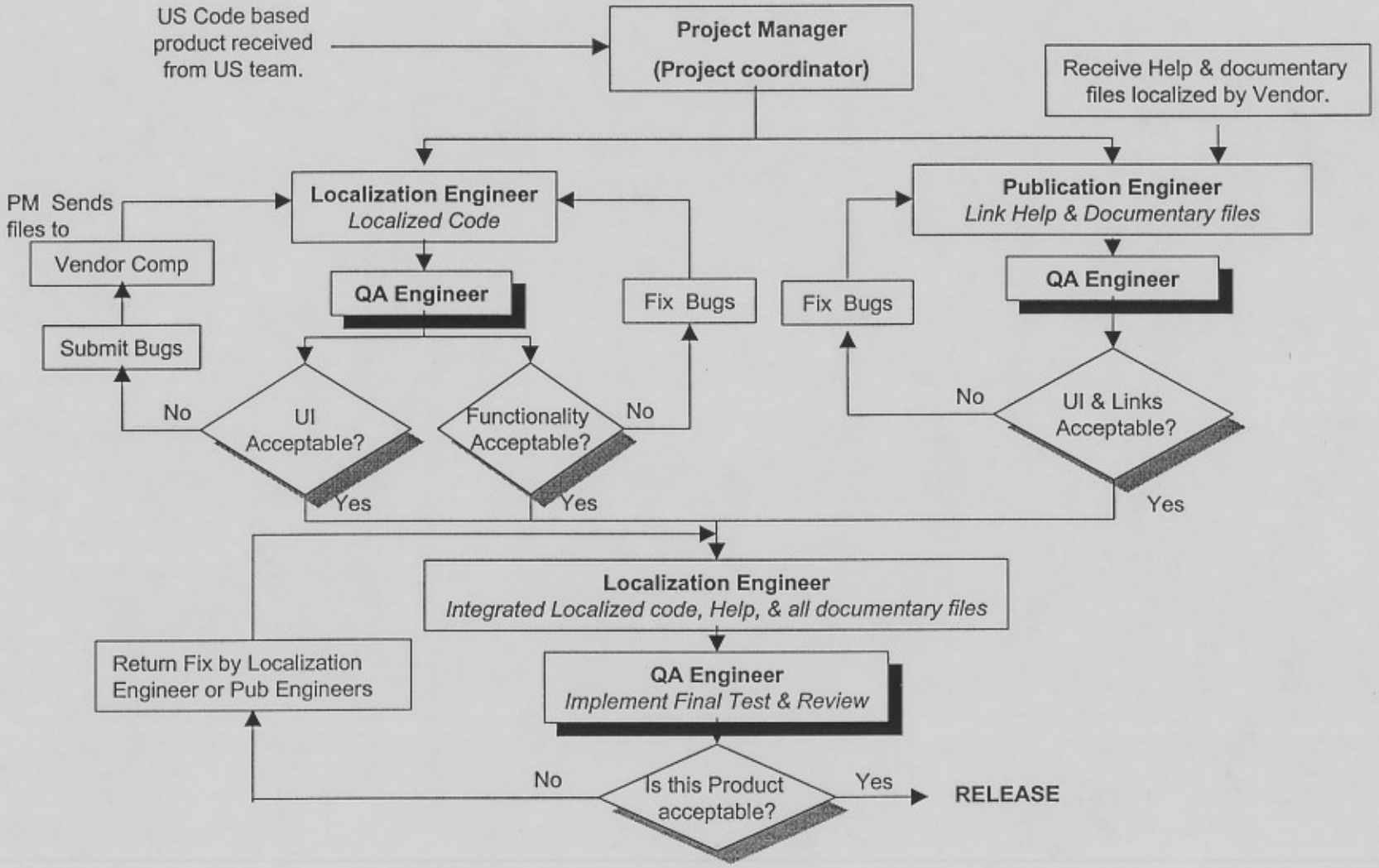
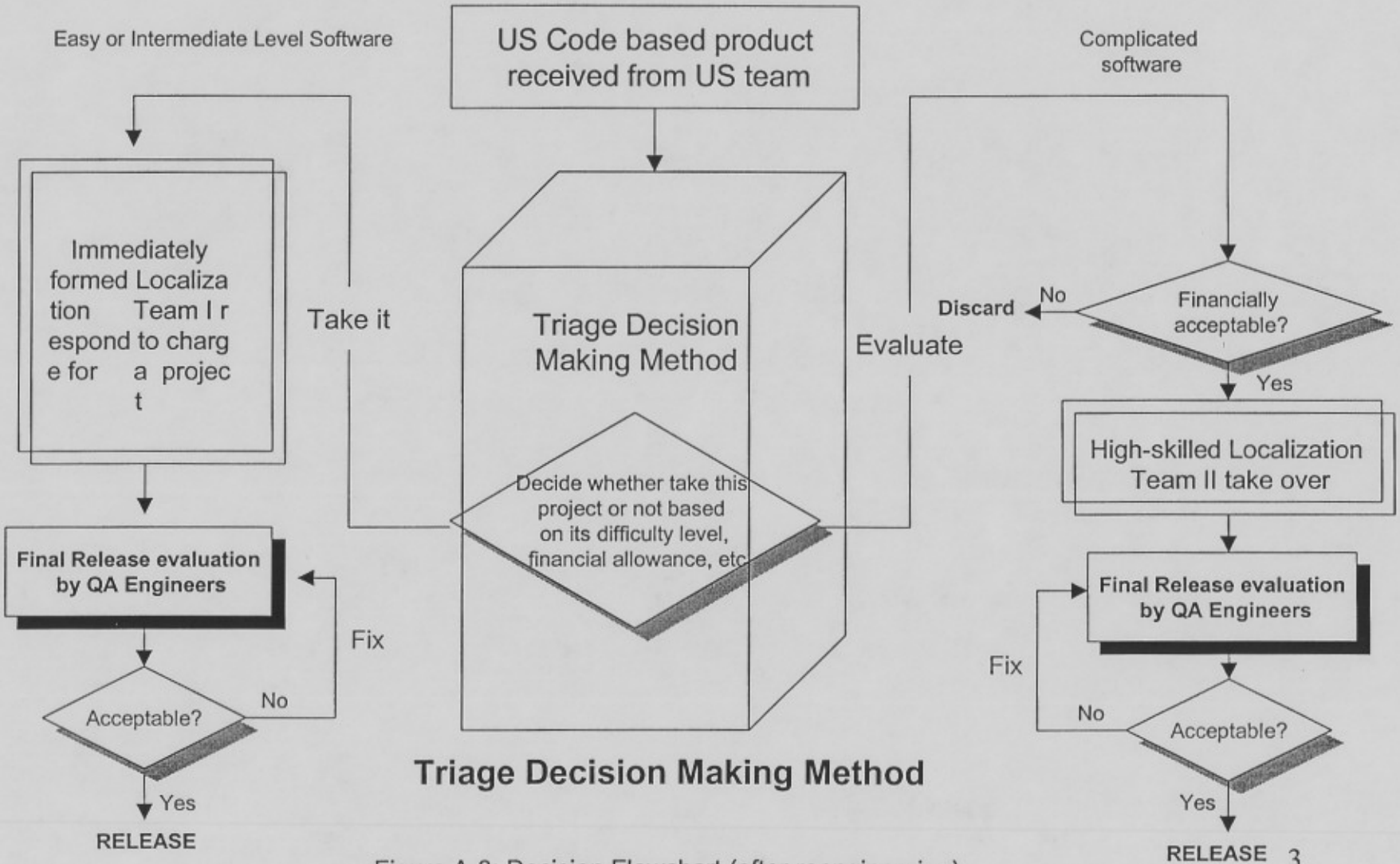


Figure A-2: Decision Flowchart (before reengineering)

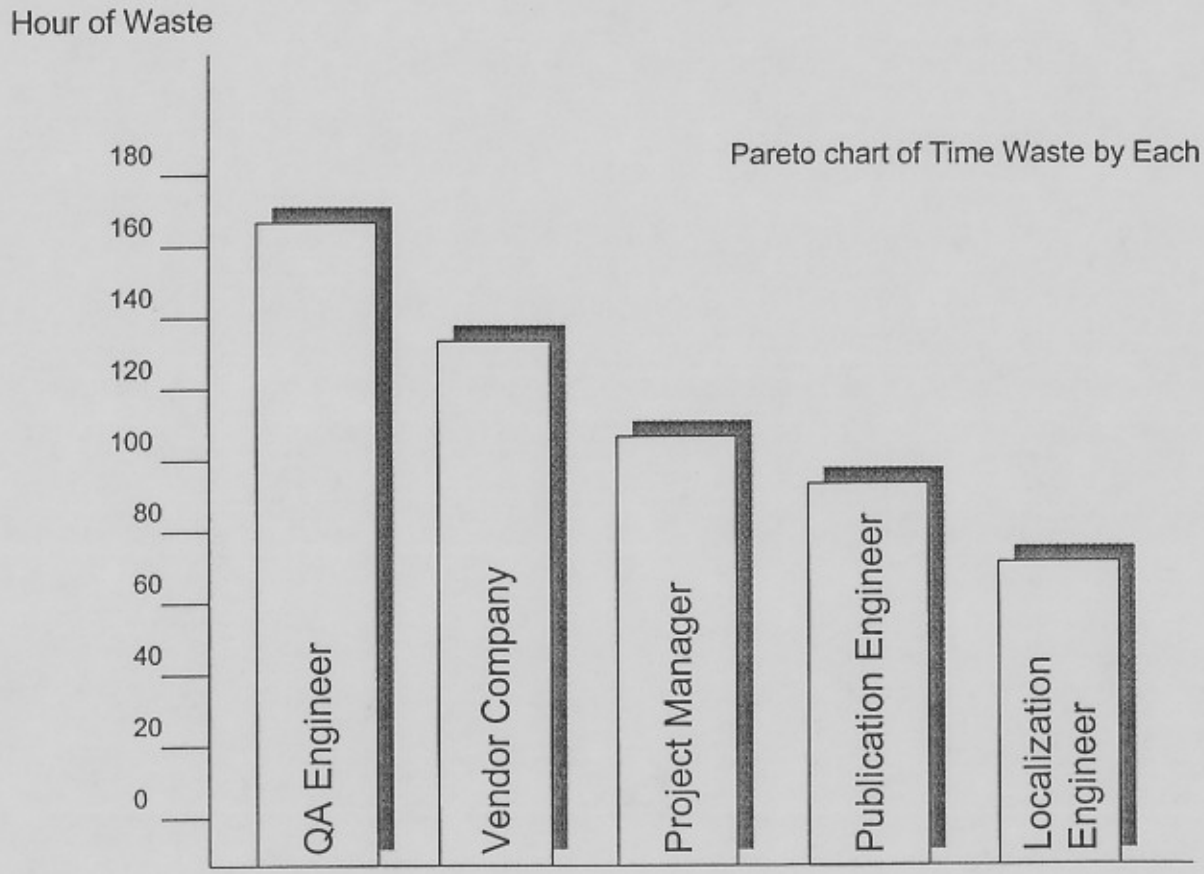
NEW IPD DECISION FLOWCHART



Triage Decision Making Method

Figure A-3: Decision Flowchart (after reengineering)

Example of Pareto Chart of Time Waster



Not referred to in the book.

Figure A-4: Pareto chart of time waste by each function (before reengineering)

IPD Decomposition Diagram

Localization Engineer	QA Engineer	Project Manager	Publication Engineer
1.1 Localize the US code based product into localized product. **1.2** Make a localization one functionally and visually **1.3** Modify a features based on the regional settings	**2.1** Test localized product of its functionality & UI **2.2** Modify a test script originally given from US team **2.3** Do 1st, 2nd, and Final Test pass **2.4** Report Defect Analysis when it is done	**3.1** Coordinate a project schedule based on the given budget **3.2** Communicate with Technical Marketing Department to satisfy what customers want to see **3.3** Organize a meeting between Local, QA, & Pub Engineer to fix defects.	**4.1** Link localized Help files **4.2** Localize bitmap pictures appearing for Help files **4.3** Link localized User License Agreement **4.4** Link Product License Agreement **4.5** Put the correct product version & legal marks ((TM) or (R))

Figure A-5: IPD Decomposition Diagram (before reengineering)

PROCESS FLOW DIAGRAM
For International Product Department

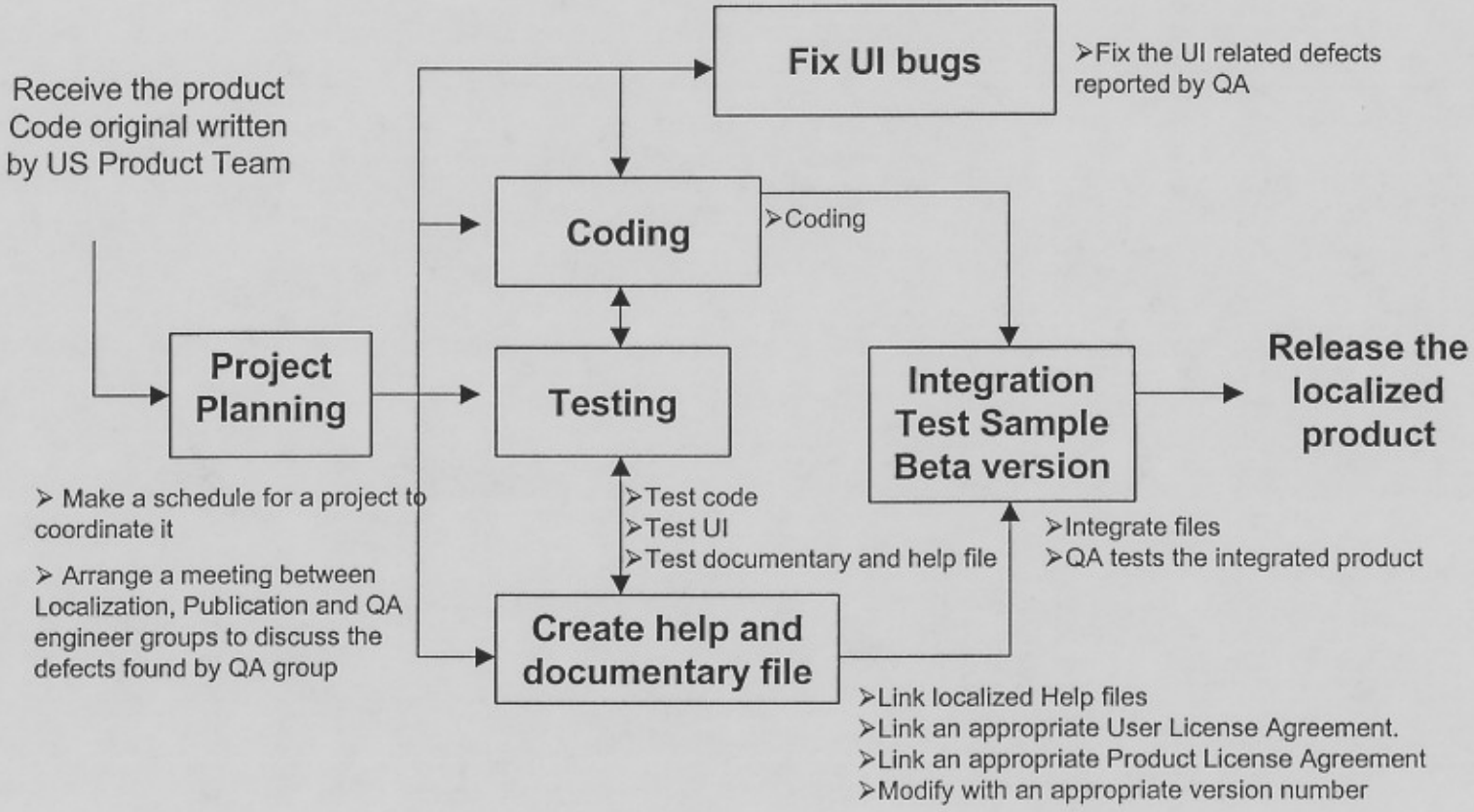


Figure A-6: Process Flow Diagram for entire IPD (before reengineering)

IPD Work Flow Diagram

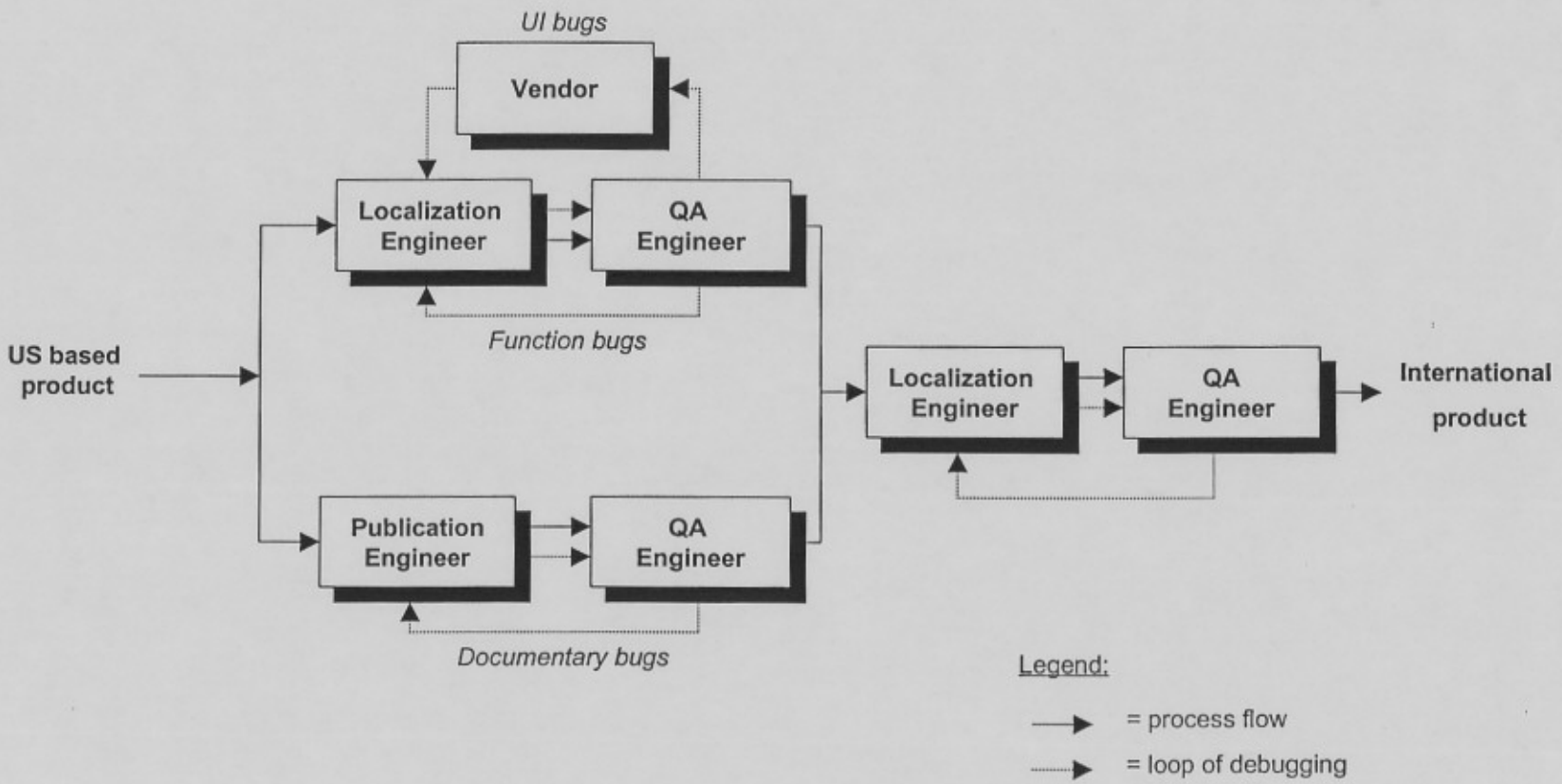


Figure A-7: Work Flow Diagram (before reengineering)

IPD Responsibility Interface Matrix Diagram

Task	Project Manager	Localization Engineer	Vendor	Publication Engineer	QA Engineer
Scheduling	R	I	I	I	I
Coding		R	I		I
UI		O	R		I
Help and documentary				R	I
Integration		R,O	O	O	I
Quality checking		I,O		I,O	R
Legend:					
R = responsible					
I = get input from					
O = give output to					

Figure A-8: Responsibility Interface Matrix (before reengineering)

IPD Decomposition Diagram

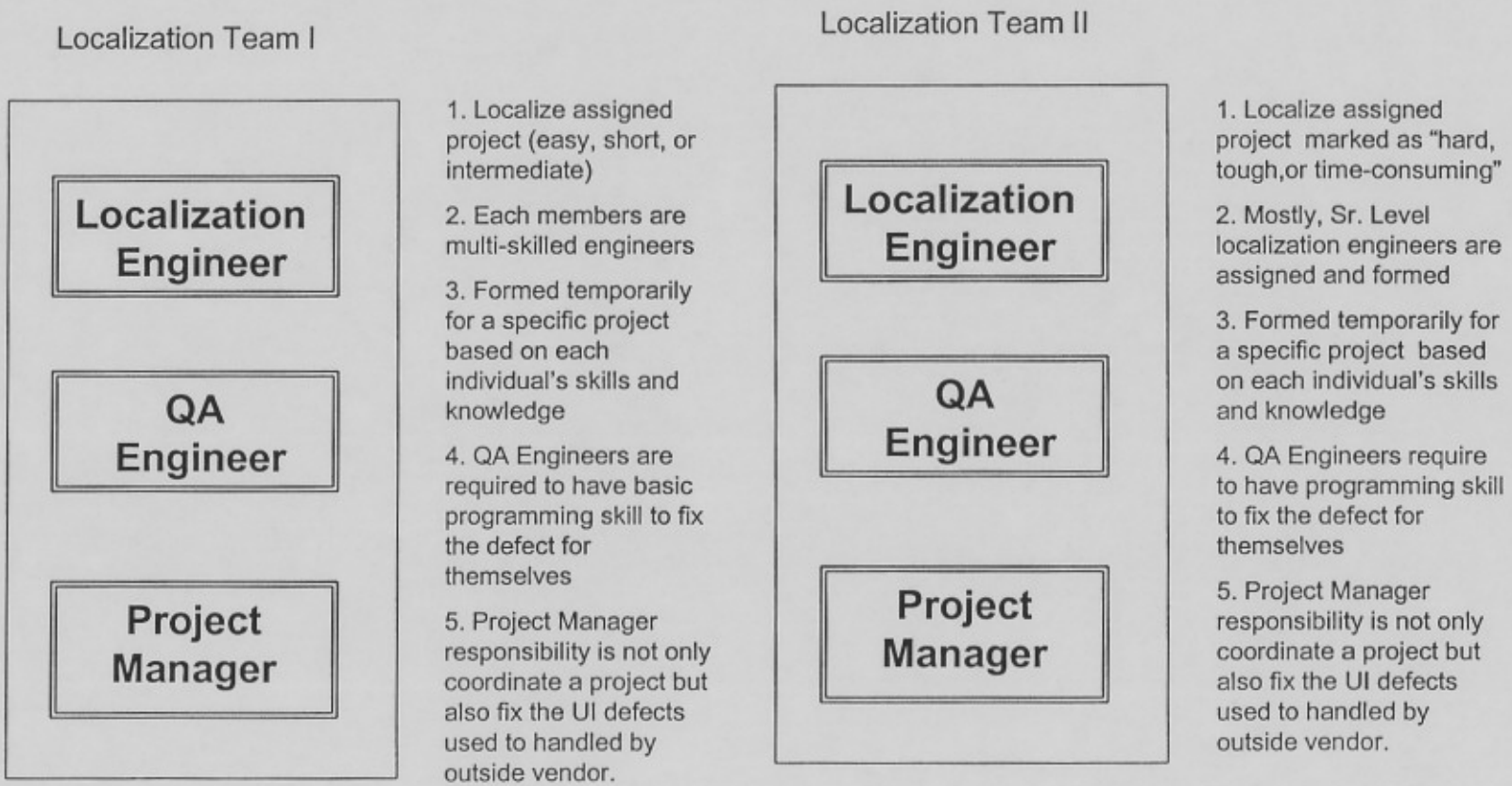


Figure A-9: IPD Decomposition Diagram (after reengineering)

PROCESS FLOW DIAGRAM
For International Product Department

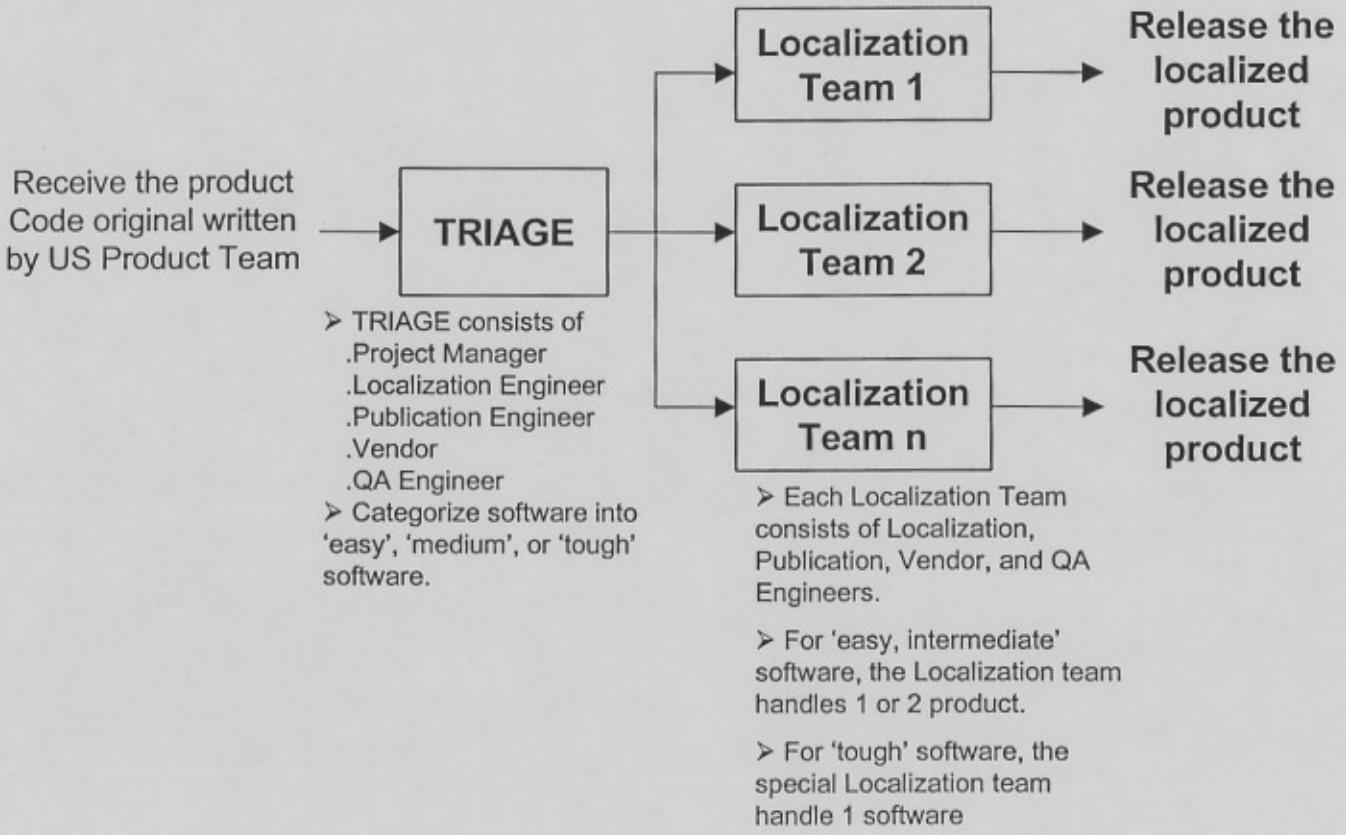


Figure A-10: Process Flow Diagram for entire IPD (after reengineering)

IPD Work Flow Diagram

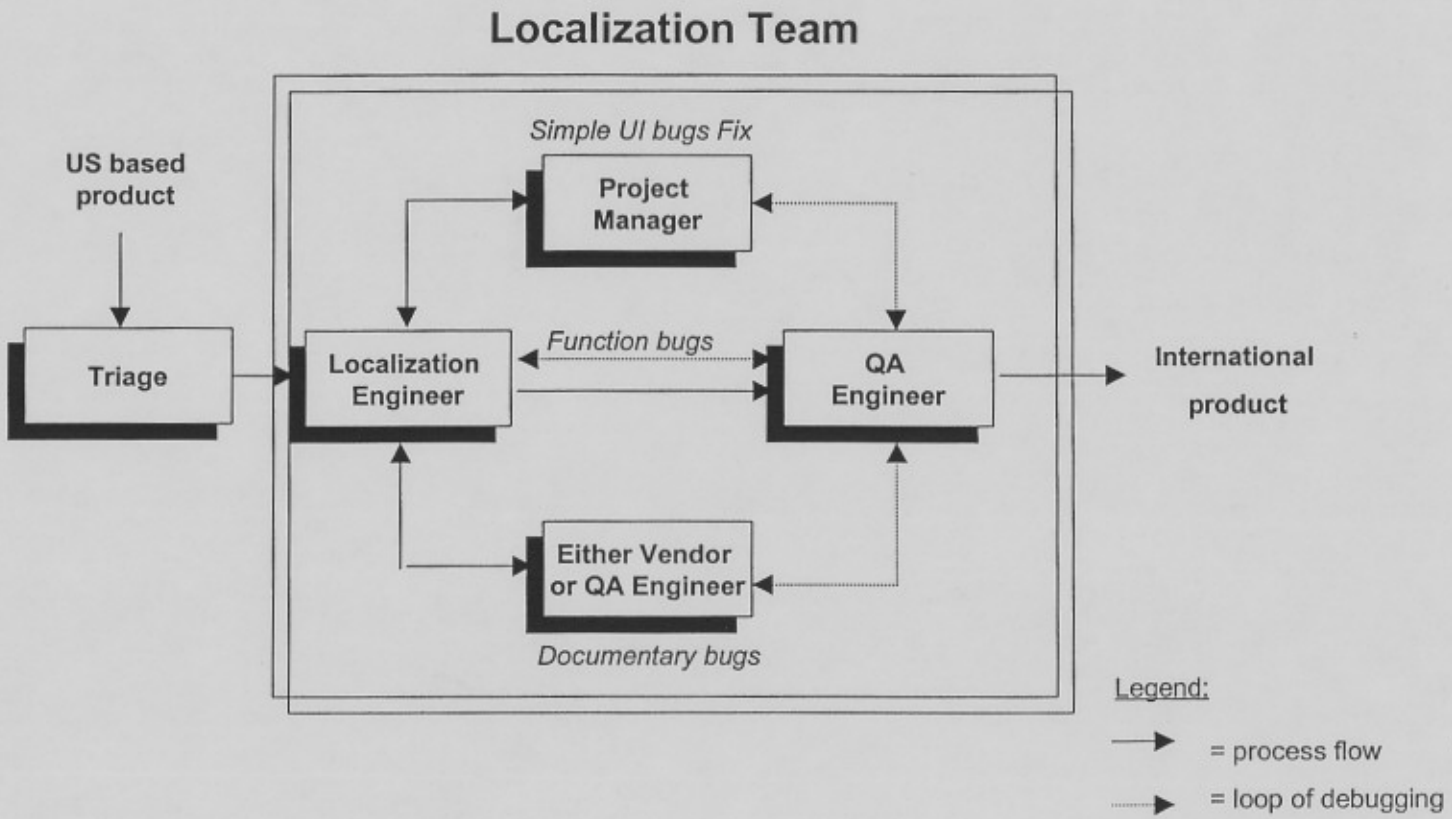


Figure A-11: Work Flow Diagram (after reengineering)

IPD Responsibility Interface Matrix Diagram

Task	Project Manager	Localization Engineer	Vendor	QA Engineer	
Scheduling	R	I,O	I,O	I,O	
Coding		R	I,O	I, S	
UI	S	I,O	R	I, S	
Help and documentary	R			I	
Integration		R,O	I,O	I	
Quality checking		I,O	I,O	R	
Legend:					
R = responsible					
S = Secondary Responsible					
I = get input from					

Figure A-12: Responsibility Interface Matrix (after reengineering)

Bibliography

Hammer, Michael, and James Champy. *Reengineering the Corporation: A Manifesto for Business Revolution,* HarperBusiness, New York, NY. 1993.

Hammer, Michael, and Steven A. Stanton. *The Reengineering Revolution: A Handbook*, HarperBusiness, New York, NY. 1995.

James Champy. *Get Ready For More Reengineering*, Sales & Marketing Management, (March 1998): 26-27.

King, Ira. *The Road To Continuous Improvement: BPR and Project Management*, IIE Solutions (October 1996): 22-27.

Thomas A. Stewart. *Reengineering: The Hot New Managing Tool*, Fortune (August 23, 1993): 40-45.