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Why we drink beer: Using QFD, Kansei, and AHP to Understand How Consumers Identify with Brands

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Abstract

There are numerous approaches for understanding consumer motivation and insight. This paper explores the application of new product development methods such as Quality Function Deployment, Kansei Engineering, and Analytic Hierarchy Process to assist sales and marketing groups to better understand how customers feel about the products they buy. QFD is a Japanese created approach to translating the voice of the customer into product functional requirements, kansei is a Japanese created approach to identify product sensory attributes that affect consumer emotions and image, and the AHP is an American created method to determine priorities based on human decision making modes. The authors have applied these techniques to learn about how the image that Thailand's premier beer, Singha, is perceived by consumers in the U.K.

Key words

QFD, kansei, AHP, beer, consumer motivation

Introduction

Beginning in the 1950s, Japanese product developers developed a sophisticated system of improving quality in goods and services based on the teachings of the American quality guru, W. Edwards Deming.¹ Early focus was on improving the quality of manufacturing – variability reduction through statistical process control, but as problems in the plants were reduced, quality efforts soon migrated upstream to improving design engineering, marketing, and even strategic product planning.² Improving quality has come to address, in addition to the functional workings of the product, the total ownership experience. This means that non-functional or self-esteem qualities can have important (and in some cases more important) contribution to the value of a product. To this end, *kansei* engineering was developed in the 1980s to apply quality and statistical thinking to what had been considered an industrial design arena.³

The Singha Beer Project

Boon Rawd Brewery, owner of the Singha brand, is a privately held business begun in 1933. As Thailand has become an increasingly popular tourist destination, the affection for its food and drink has been shared by returning travelers, resulting in three phenomena:

1. a growing number of Thai restaurants worldwide
2. experimenting with Thai cooking at home, and thus
3. a growing demand for Thai ingredients (including beer) at food markets.

This has been a big boon for Singha, leading to a global network of distributors. To assure that past success would continue, the authors were asked to research their foreign customers to better understand their interests, motivations, self-image, and what other characteristics they might share. The original problem posed by the authors was “we sell beer in the U.S., U.K., and Australia, but we don’t know why they drink it.” Thus, the goal of the project was not to change the beer formulation, the logo or packaging, or any of the usual tangibles we see in QFD and *kansei* studies, but rather to hear the inner voices of our non-Thai customers and how Singha Beer fits into their love of life.



Methodology

While traditional QFD tools such as the House of Quality⁴ have enjoyed longtime use among product developers, the modern tools in Blitz QFD⁵ add deeper analytic insight into the unspoken needs of the customer. In this project, we used the custom tailored process shown in figure 1. There is no “one size fits all” way to do QFD, since each company, its management of the product development process, its customers, technology, and other factors present unique challenges. A common mistake to be avoided is to try to fit the company to a standardized QFD, rather than tailor QFD to fit the company. Many QFD practitioners have only been exposed to the 4-house automotive components approach to QFD and experience great difficulty in trying to make their new product development process align to that. In Singha Beer’s project, such tools as the House of Quality were unnecessary and so are omitted in favor of adaptations of some of the Blitz QFD[®] tools. Each of the 5 steps will be explained with examples from the project.

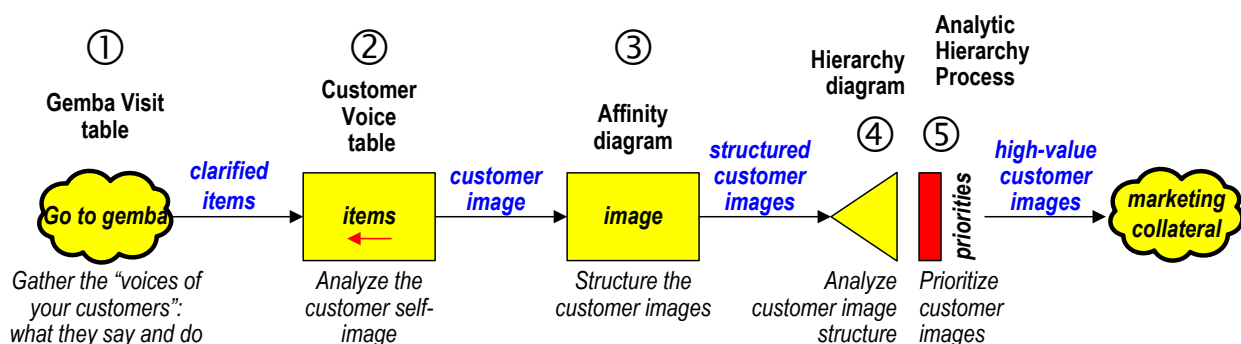


Figure 1. Custom tailored QFD process for Singha Beer

Step 1. The Gemba

The project began in the U.K. with the help of UK Singha’s agents. They were asked to identify and arrange for the Singha team to visit the largest Thai restaurant chain in London, as well as some pub chains and supermarkets. For confidentiality reasons, these locations are omitted here. The Singha gemba team included both authors, Pichet Changkasem Distribution Development Manager, Jeerachot Sathirakul Marketing Manager, Boonchai Asavalitiporm Consultant, and Kasamapong Suttangkakoon Consultant. The advertisements and marketing collateral were developed by Publicis in the U.K.

Gemba is a Japanese term that means the place where the truth can be learned, and it is commonly used in process quality improvement to help find the true causes of deficiencies or variability. In marketing and new product development, *gemba* now refers to the place where customers use the product and is where we can learn the truth about their needs, and in this project, self-image. The best results occur when we can observe the customer in the act of buying or consuming the product so timing is very important. To assure that we correctly identify these opportunities, a Customers Segments table is used. See table 1. The table is built on the journalistic questions of who, what, when, where, why, and how a product is used. Additional columns are often added in custom tailoring. While the table is valuable for identifying key customers to visit, in this project this was already decided before we started. Here, our purpose was to note the best time and place to interact with these *gembas*. Unknowns were also identified and explored in detail during the project.

Table 1. Customer Segments table for U.K.

Who uses product?	What is product used for?	Where is product used?	When is product used?	Why is product used?	How is product used?
business people at lunch	go with meal	restaurant	lunch	lunch beverage, take edge off bad day or end of week	glass
business people relaxing after work at pub	quench thirst	pub, indoors or outdoors	after work	relax after work, socialize with friends, while waiting for friends to arrive	pint or bottle
business people having dinner with friends and family	go with meal	restaurant	night	dinner beverage, relax in evening	glass
shoppers at market	drink later	home, BBQ	?	always buy beer	?

The *gemba* visits included 26 open ended interviews with 57 drinkers, observation studies of shoppers, and some demographic questions to qualify the respondents. QFD research has shown that to obtain qualitative data (not quantitative), sample sizes on 20 will usually yield about 75% of the data, with

additional samples tending to repeat rather than add new data.⁶ These were audio taped so that the interviewer could focus on the customer without worrying about writing large amounts of data. The audio data (over 271MB) and interviewer notes are what we call in QFD, raw “voice of customer” data. In this unanalyzed state, the raw voice is complex, fast-flowing, and includes many pieces of information. Modern QFD teaches several techniques to help avoid these common cognitive errors:

1. affective errors – we only see what we wish to see
2. attribution errors – we see only stereotypes and this bias closes our minds to differences
3. confirmation bias – we cherry pick those facts that agree with our preconceptions and rationalize away contradicting data
4. search satisfaction – we stop searching once we find something we think is significant.⁷

Our next task is to simplify the complex, sort the co-mingled, and analyze the unspoken. One tool for this is the *Gemba* Visit table. Table 2 is an excerpt from one of the *gemba* visits. There are different kinds of data inputs we can collect, namely observations (things we see), verbatims (things we hear), documents (written data provided by the customer), notes (written data and inferences produced by the *gemba* visit team), evidence (physical specimens, samples, failed or destroyed pieces), etc. For traceability, it is helpful to segregate these in the table. Another section of the table that describes the interviewee characteristics and the circumstances of the *gemba* is omitted here, but is crucial to the step of simplifying, sorting, and analyzing. We call this clarification and it produces the clarified items shown in the table.

Table 2. Excerpt of *Gemba* Visit table

Observations	Verbatims	Documents	Notes	Clarified Items
8 men, 1 woman having buffet. 4 Coronas, 2 Singhas, 3 soft drinks.	Like Thai food because less salty than Chinese or Indian food, so it is milder and easier to eat at lunch. Usually have a beer at lunch = prefers Corona because it is less "gassy." Like authentic flavors and fragrance. Cooks Thai style at home by adding coconut milk and green curry which are easily available, for a special meal that is unusual and romantic (and it works!).		Need to go back to work and be in appropriate mood for work (not drunk)	Fast (I have one hour for lunch, and I walk 10 min from office) Easily available Good deal Fragrant Mild With work team Break from the usual Light Authentic Special moments Romantic

Clarification is one of the more difficult steps in modern QFD because it requires the team to explore beyond the obvious in order to discover things we do not know we do not know – the unknown unknowns. In the excerpt in table 2 the clarified items are extractions of several of the verbatims such as mild, authentic, etc. A little deeper analysis about preferring Corona (a Mexican beer) because it is less gassy at lunch as well as the need to get back to the office to work, added the clarified item of “work team.” Notice that the clarified items refer to Thai food, lunchtime, entertainment, beer/beverages,

self-image, and other matters. The purpose of this table is to capture all this and to trace the evolution of the data.

Step 2. Voice of Customer

The clarified items in the *Gemba* Visit table contain many kinds of data, some of them directly relevant to this study; others must be translated into relevant data. In most QFD studies where the objective is to create a new product or service, we often find that the clarified items include many statements about the subject product. Since the typical customer is less knowledgeable about the product than the QFD team, these statements are considered the customers best attempt to explain what they think they want. Forty years of QFD experience has shown us that customers do not always get it right for several reasons. In this restaurant example, the customer may state they wish to be seated immediately, but that is not a customer need since “wait time to be seated” is a service feature. We must translate this feature into a customer need or benefit such as “I need to be back at my office in one hour.” The product or service designer will be better able to fulfill this need by now understanding that even though the customer only voiced the wait time to be seated, the true need was to depart the restaurant in time to walk back to work. That means that other features such as time to give order, time to prepare order, time to serve order, time to eat (which could be affected by the temperature of the food when served) time to pay, etc. might be ignored if we only responded to the customer’s original statement. Additional solutions such as the sequence of service such as taking the order before seating (by phone, text message, website, while waiting, etc.), prepaying at the time of order, etc. might also be ignored.

The Customer Voice table is used to facilitate this translation process. The table should include necessary information to retain fidelity to the original voice of the customer as well as circumstantial data to shed light on the outcomes (sometimes called the “job”) desired by the customer. In many cases, we will start with the clarified items and the customer characteristics and circumstances (scene) from the *Gemba* Visit table thereby linking the two tables together. Some of the clarified items may already be customer needs but some of them may be customer problems (negative outcomes such as “I will get fired if I return late from lunch) and product features. These problems and features can also be translated into customer needs.

Table 3. Customer Voice table

clarified items	#	customer scene	benefit		product
			need/image	problem	
Fast (I have one hour for lunch, and I walk 10 min from office) Easily available Good deal Fragrant Mild With work team Break from the usual Light Authentic Special moments Romantic	1	Lunch time in London's central business district on a warm, sunny Monday. Mostly office workers in business or casual clothes, younger ones are single. Warm sunny day, in upstairs a la carte menu dining. Those in a hurry enjoying downstairs Buffet (6GBP), those with more time (business lunch, colleague birthday party) in upstairs a la carte menu dining. Most having soft drinks as it is too early in week for alcohol at lunch - Monday (first day of week).	I want to have fun with my friends. I want something convenient. I enjoy the fragrance. I want to feel refreshed afterwards. I like to be adventurous. I want to spend my time the way I want. I'm in control. Authentic. Romantic. Special moments. A break from the ordinary. I'm a leader. I know what I like.		Good deal. Fragrant food. Mild spices. Light meal.

In the beer project, the objective was to learn about customers' self image rather than product needs so it has been modified a little by looking for customer image needs. In table 3, the shaded column called need/image shows the results of this analysis for this customer. For example, the statement "break from the usual" was translated into "I like to be adventurous." Is this an accurate translation? At this point we do not know, but the QFD team itself has ventured outside the obvious statement to infer that there may be additional meaning. We will test this statement later in the process when we ask customers to prioritize these images. If the translation is wrong, it will fall to a low priority and not be considered further. If the translation is correct, it will receive a high priority and be carried forward into the marketing collateral. Since it was unspoken by the customer, the competitors may also be unaware, and thus we may be able to take advantage of discovering something first.

In a full Kansei Engineering study, instead of the Customer Voice table, Lifestyle Deployment table would be used to extract these image needs from ethnographic studies, observational studies, and other inputs.³ In custom tailoring the tools for this project, the table above was hybridized by the authors.

Step 3. Customer *Kansei* Image Structure

The *kansei* image needs captured in the Customer Voice table will be presented to another group of customers in the same market segments to determine which of these images are preferred and thus will be used in creating the marketing collateral. In QFD, we commonly use a three stage process for prioritization based upon a technique known as the Analytic Hierarchy Process or AHP, explained below.

The first stage is to understand how customers think about their self-images and how they relate. The *kansei* image needs were written onto cards and presented to three small focus groups. They were asked to cluster these into groups based on some common theme and then to give a name to the group. Figure 2 is an excerpt from one of the groupings.

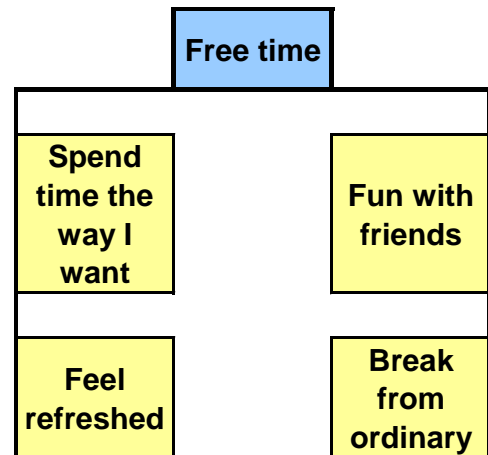


Figure 2. Affinity diagram of *kansei* image needs.

Step 4. Customer *Kansei* Image Hierarchy

The second stage of the prioritization process is to combine the affinity diagrams of the various focus groups into a unified hierarchy diagram. Combining several affinity diagrams into a unified hierarchy diagram is best done by an experienced QFD facilitator and confirmed with customers. The hierarchy diagram is then analyzed to make sure that levels of abstraction are not comingled among the groupings. This is critical for the AHP which relies on forced comparisons. For example, if we were to ask which was preferred – an apple or an orange – we could get a discreet answer. However, if we asked which was preferred – an apple or a fruit – the respondent would be unable to reply since an apple is a type of fruit. This is an abstraction problem which must be corrected prior to the AHP. Figure 3 is an excerpt from the unified hierarchy diagram.

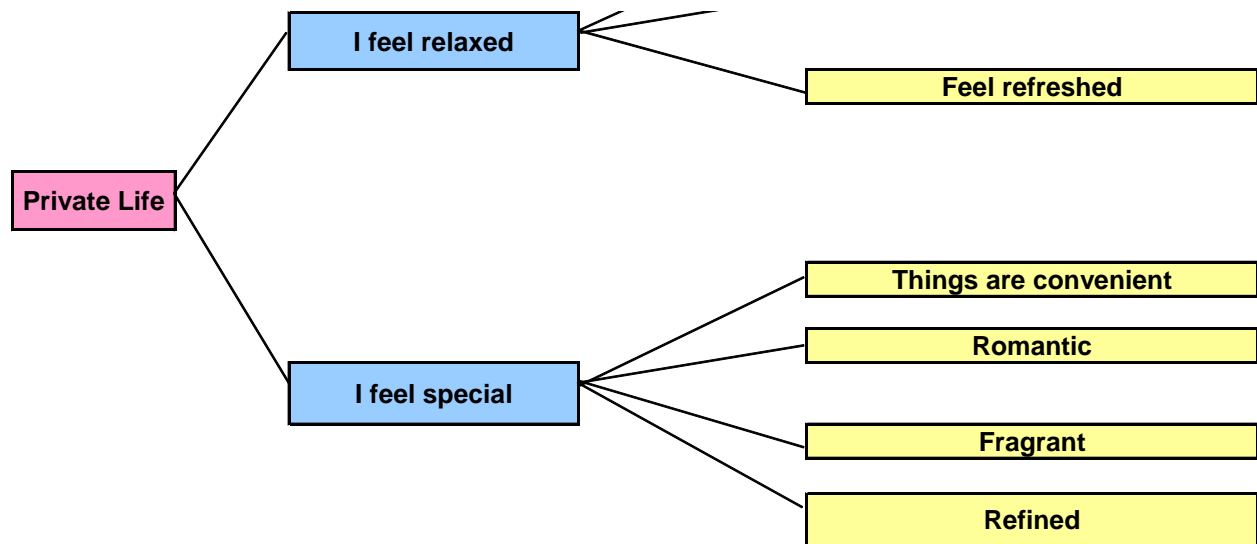


Figure 3. Hierarchy diagram of *kansei* image needs.

Step 5. Customer *Kansei* Image Prioritization with AHP

The third stage of the prioritization process is to apply the AHP⁸ to learn which images are most preferred by the customers. Prioritization in multi-criteria decision-making was advanced by the research of Dr. Thomas Saaty in the 1970s at the U.S. Department of Defense and later at the Wharton School of Business at the University of Pennsylvania. Saaty found that decision makers facing a multitude of elements in a complex situation innately organized them into groups sharing common properties (affinity diagram), and then organized those groups into higher level groups, and so on until a top element or goal was identified (hierarchy diagram). This is called a hierarchy and when making informed judgments to estimate importance, preference, or likelihood, both tangible and intangible factors may be included and measured. The Analytic Hierarchy Process (AHP) was created to manage this process in a manner that captures the intuitive understanding of the participants and also yields mathematically stable results expressed in a numerical, ratio scale. A numerical, ratio scale is preferred for the following reasons:

- Numerical priorities can be applied to later analyses to derive downstream priorities.
- Ratio scale priorities show precisely how much more important one issue is than another. Ordinal scales only indicate rank order, but not the magnitude of importance.
- Numerical scales can be tested for judgment inconsistency, sensitivity, and other useful properties.

Starting with the highest level of abstraction in the hierarchy, three more small focus groups were asked to express their preference for the *kansei* image needs. In other words, how did they wish to see themselves or be seen by others whose esteem they valued? The words were presented to them in pairs

and they were asked to identify which word was preferred and by how much using a verbal scale of somewhat, more, very much more, or extremely more preferred. In the AHP method, these verbal scales are entered into a numerical matrix and the calculated eigenvalues (row average) quantify the ratio scale preference of the words. Judgment inconsistency was also calculated and was within acceptable limits. Table 4 shows the results of one of the hierarchy branches of one of the focus groups. Figure 4 shows the AHP results applied to the hierarchy. Checked items are *kansei image needs* that are given to the advertising agency to build the marketing collateral, as they indicate which self-image the targeted market segments most strongly prefer.

Table 4. AHP of one tertiary branch.

I feel special	Things are								sum	row avg
	convenient	Romantic	Fragrant	Refined						
Things are convenient	1	5	9	1	0.433	0.543	0.375	0.409	1.760	0.440
Romantic	1/5	1	5	1/3	0.087	0.109	0.208	0.136	0.540	0.135
Fragrant	1/9	1/5	1	1/9	0.048	0.022	0.042	0.045	0.157	0.039
Refined	1	3	9	1	0.433	0.326	0.375	0.409	1.543	0.386
	2.311	9.200	24.000	2.444	1.000	1.000	1.000	1.000	4.000	1.000
									Inconsistency	0.04

Figure 4 shows the AHP results applied to the hierarchy. Checked items are *kansei image needs* that are given to the advertising agency to build the marketing collateral, as they indicate which self-image the targeted market segments most strongly prefer. Other highly ranked *kansei image needs* included “spend time the way I like,” “I am adventurous,” “Break from the ordinary,” and “Exotic.”

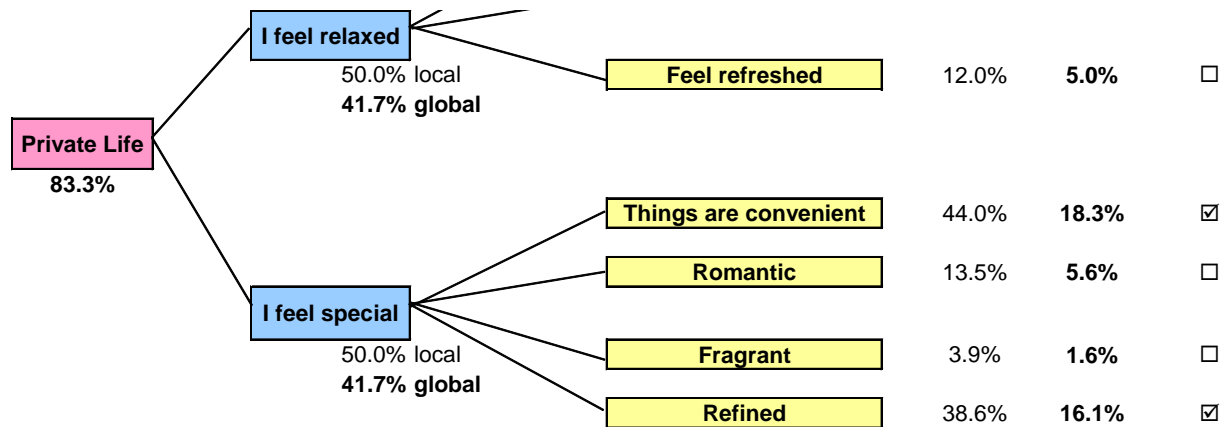


Figure 4. AHP priorities applied to the *kansei image needs* hierarchy diagram.

Marketing Collateral

In addition to the *kansei image needs*, the Singha marketing team also considered their brand truth of “authenticity” (first beer in Thailand) and “prestige” (only beer in Thailand brewed under Royal Permission of King Rama 7), and their brand asset of Thailand as a place for travel, vacations, out-

doors/beaches, and culture. Thus, the elements for defining the new brand essence were extrapolated from this formula of image needs + brand truth + Thailand. The kansei image needs hierarchy was generalized to a meta-metaphor of the "journey" of "Drinking Singha from the first drop to the last drop" as shown in figure 5.



Figure 5. Illustration of Singha's meta-metaphor "journey."

Armed with these images and words, the advertising agency Publicis was asked to create marketing collateral such as advertisements, promotions, etc. Keying off of "Journeys, Adventures/ Discoveries, Experiences, Fun, Authenticity - All captured in a bottle" they have distilled a new brand essence of

SINGHA TRANSPORTS YOU WITH EVERY DROP

and the selling line

FOR THE ROAD LESS TRAVELLED

to generate advertising ideas such as

- Singha beer takes you on a journey of discovery taking you to places that are less travelled.
- Singha Beer is a journey of discovery for the world's adventurers.

Print ads are being generated to appear in magazines beginning in third quarter 2009. One prototype is shown in figure 6.



Figure 6. Print ad for Singha Beer to appear 3Q 2009.

Conclusion

While quality methods like QFD, Kansei, and AHP have been long used to create new products and services, Singha Beer has extended their utility to better understanding why their customers like their product from an emotional perspective, in order to produce advertisements that speak to their inner wishes. Singha believes that by directing advertisements to kindle these wishes, consumer interest will grow around the world.

About the Authors

Theera Vongpatanasin has worked as a strategy consultant with Coopers & Lybrand (now PriceWaterhouseCoopers) from 1993-1997 and Auriga, a Bangkok consultancy, from 1997-1999. He joined Accenture as a senior manager in the Strategy and Business Architecture group from 1999-2003. From 2003-2007 he was the managing director of Asia Books Co., Ltd. and is currently the managing director of Boon Rawd Trading International Co., Ltd. He earned his QFD Green Belt® in September 2006 (Tokyo) and QFD Black Belt® in December 2006 (Austin). theera_v@boonrawd.co.th

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References

- ¹ Deming, W. Edwards. 1982, 1986. *Out of the Crisis*. MIT-CAES. ISBN 0-911379-01-0
- ² Mazur, Glenn H. 2008. "Delighting Customers with Quality Function Deployment: Voice of Customer meets Voice of Process." *Transactions of the 14th International Symposium on QFD*. Beijing China.
<http://www.mazur.net/works/Mazur%202008%20Deming%20Management%20and%20QFD.pdf>
- ³ Mazur, Glenn H. 2005. "Lifestyle QFD: Incorporating Emotional Appeal in Product Development." *Transactions of the 17th Symposium on QFD*. ISBN 1-889477-17-6
http://mazur.net/works/Lifestyle_QFD_Incorporating_Emotional_Appeal_in_Product_Development.pdf
- ⁴ Akao, Yoji, ed. 1990. *Quality Function Deployment: Integrating Customer Requirements into Product Design*. Translated by Glenn Mazur. Cambridge, MA: Productivity Press. ISBN 0-915299-41-0
- ⁵ Hepler, Carey and Glenn Mazur. 2006. "Finding Customer Delights Using QFD." *Proceedings of Quality Institute for Healthcare Annual Conference*. American Society for Quality. Section 1.
http://www.mazur.net/works/Hepler_Mazur_2006_Finding_Customer_Delights_at_Blue_Cross_Blue_Shield_Florida.pdf
- ⁶ Pouliot, Fred. 1992. "Capturing the Voice of the Customer." *Proceedings from the GOAL/QPC Ninth Annual Conference, Advanced QFD Session*. Methuen, MA: GOAL/QPC. www.goal-qpc.com
- ⁷ Groopman, Jerome, M.D. 2007. *How Doctors Think*. Marinerbooks.co, ISBN 978-0-547-05364-6
- ⁸ Hepler, Carey and Glenn Mazur. 2007. "The Analytic Hierarchy Process: Methodologies and Application with Customers and Management at Blue Cross Blue Shield of Florida." *Transactions of the 19th U.S. and 13th International Symposia on QFD*. QFD Institute. ISBN 1-889477-19-2
http://www.mazur.net/works/Hepler_Mazur_2007_AHP_with_Customers_and_Management.pdf