MEASURING SERVICE QUALITY IN SOFTWARE OUTSOURCING AT QUANTIC Co., Ltd- A DIMENSION-BY-DIMENSION ANALYSIS

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ABSTRACT : *The issues of measuring service quality in software industry are not considered important even though the IT industry grew fast and dramatically in recent years. This research aims to investigate the customers' perception and expectation of services provided by Quantic Co., Ltd. by using the market research instrument called SERVQUAL, the form of a dimension-by- dimension. A sample of 137 customers were asked of the perception and expectation of services to identify the service quality by using questionnaires. Descriptive analysis revealed that the service quality gap in two dimensions- Assurance and Reliability- were high in comparison to that of the others. It suggests Quantic Co., Ltd some programs to do to reach customers' expectations.*

1. INTRODUCTION

Vietnam's software industry was established in 2000 and grew rapidly, up to more than 750 software firms in 2008, yielded more than US$600 million. Around 150 firms are involved in software outsourcing with an average number of 100 to 150 software workers.

Quantic was established in 1991 in Ho Chi Minh City, Vietnam. Over 15 years experience in providing software outsourcing services for North America, Japan, and Europe customers help Quantic gain the reputation as one of the leading offshore outsourcing service provider of Vietnam. Currently, Quantic has 120 software engineers; the number of customers is around 20-30 per year, which has outsourced to Quantic around 100 software projects per year. Quantic's sale revenue has grown from US$0.7 million in 2004 to US$2 million in 2008.

Due to the impact of the economic recession, Vietnam Software Association (VINASA, 2009) admits that this year will see the growth rate of Vietnam's software industry slow down when foreign giant information technology companies narrow down its production and thus reduce outsourcing contracts for developing countries like Vietnam. In addition, the customers expect a higher quality when they decide to selectively outsource some

parts of their large software projects to a vendor. It is important for Quantic to clearly determine the service quality gap of customers' expectations in software outsourcing vendor and the current service quality in Quantic. The objective of the research is to define the gap scores for the dimensions of SERVQUAL in Quantic's software outsourcing activities.

2. THEORY BASE OF SERVICE QUALITY

What is a service?

There are many definition of service. In this research, we can consider Christopher & Jochen (2004): *"A service is an economic activity that creates value and provides benefits for customers at specific times and places by bringing about a desired change in, or on behalf of, the recipient of the service"*.

Characteristics of service

Peter and Angela (2006) discuss that services have the following four key distinguishing characteristics: Intangibility, Inseparability, Heterogeneity, Perishability

Service quality

Service quality is a critical component of customer perceptions about the service. Customers perceive services in terms of its quality and how satisfied they are overall with their experiences. As thus, service quality is defined as customers' perception of how well a service meets or exceeds their expectations (Zeithaml & Bitner, 2000).

Service quality model

There were various service quality models proposed and applied in different contexts. For the purpose of this research, concepts and literatures related to SERVQUAL (Parasuraman et al., 1988). SERVQUAL is a multi-item scale, diagnostic methodology developed to assess customer perceptions of service quality in service and retail businesses. The scale containing 22 items that was grouped into two set of statements, expectation and perception about the particular firm whose service quality was being evaluated. Furthermore, these items were grouped into following five distinct dimensions: (Zeithaml et al, 1988)

- **Tangibles**: The appearance of physical facilities, equipment, personnel, and communication materials.
- **Reliability**: The ability to perform the promised service dependably and accurately.
- **Responsiveness**: The willingness to help customers and to provide prompt service.
- **Assurance**: The employees' knowledge and courtesy, and the

ability of the service to inspire trust and confidence.

- **Empathy**: The caring, individualized attention the service provides its customers.

SERVQUAL model works on basic formula which is described as **service quality = Customers' Perceptions (P) – Customers' Expectation (E)** or in short **Q = P – E.** The 22 statements corresponding to five dimensions will be used as questionnaire to ask about the customers expectations and perceptions. Using 1-5 Likert scale, grading it from 1 (strongly disagree) to 5 (strongly agree), the score for each statement is recorded for data analysis. The results are then being used to identify positive and negative gaps in the performance perceptions of five service quality dimensions of a firm, mentioned above. The gap of performance-expectations is considered service quality for each dimension, and is evaluated as below:

$$SQ_j = \frac{\sum_{i=1}^{nj} P_{ij} - E_{ij}}{nj}$$

Where following stands for:

- SQ*j* - Service quality of a dimension j
- E*ij* - Company's expectations for an item and which relates to a dimension j
- P*ij* - Company's perceptive performance for an item and which relates to a dimension j
- n*j* - The number of items for a dimension j

Francis (1995) indicates that analysis of SERVQUAL data can take several forms: item-by-item analysis (e.g. P1 – E1, P2 – E2); dimension-by-dimension analysis (e.g. (P1 + P2 + P3 + P4/4)- (E1 + E2 + E3 + E4/4)), where P1 to P4, and E1 to E4, represent the four perception and expectation statements relating to a single dimension); and computation of the single measure of service quality ((P1 + P2 + P3 +....+ P22/22)- (E1 + E2 + E3 + ... +E22/22)), the so-called SERVQUAL gap. This research is a dimension-by-dimension analysis.

3. ANALYSIS ANG FINDINGS

Sample description

116 respondents (93.5% of the total received) are valid and input to the SPSS 11.5 for the analysis. There are 63,8% of respondents are from Japanese market, 32,8% from US market and other 3,4% from Europe market. 46,6% of respondents are project managers; 24,4 % are Top management (CEO, Director, Vice-President); 21,1% are software engineers and other 7,8% are Sales Managers.

Respondents response of Expectation

The average expectation (on scale from 1 to 5) of the twenty-two items is rated by respondents in Table 1. The mean value of item is high. The standard deviation (SD) value for all items < 1.0, which means the expectation of respondents, is almost the same for all the variables of the service quality.

Table 1. Descriptive Statistics of Expectation

	Items	Min	Max	Mean	SD
E1	The vendor's infrastructure (servers, telecom bandwidth and power supply) should be robust enough to ensure continuous progress of the project.	2	5	4.47	.715
E2	The vendor should have good support systems (Bug Tracking, Change Request Management, FTP server) for software project development.	1	5	4.45	.773
E3	The vendor's physical facilities should be visually appealing.	2	5	3.83	.794
E4	The vendor's employees should be well dressed and neat in appearance.	2	5	3.53	.796
E5	The vendor should have security policies to secure your business information.	3	5	4.57	.662
E6	The vendor should always deliver its services on time.	3	5	4.56	.579
E7	When the vendor promises to do something by a certain time, they should do so.	3	5	4.41	.561
E8	The vendor should be dependable to handle your problem.	2	5	4.11	.643
E9	The vendor should tell customers exactly when services would be performed.	2	5	4.32	.599
E10	The vendor employees should always be willing to help customers.	1	5	4.34	.697
E11	The vendor employees should never be too busy to respond to their customer's requests.	2	5	4.08	.712
E12	The vendor employees should stay late to work on customers high priority issues until they are resolved.	1	5	3.72	.931
E13	The vendor should have industry quality standards (CMMI, ISO 9001) to ensure a consistent quality approach for customer projects.	2	5	3.94	.701

E14	The vendor should have expertise to work on the customer's business domain.	3	5	4.61	.615
E15	The vendor employees should have the technology capacity to do their job well.	3	5	4.57	.608
E16	The behavior of the vendor employees should instill confidence in customers.	2	5	4.11	.720
E17	The customers should feel safe in their project development with the vendor employees.	3	5	4.11	.629
E18	The vendor should give customers individual attention.	2	5	4.20	.794
E19	The vendor employees should understand the customer's specific needs.	3	5	4.59	.510
E20	The vendor employees should share approach ideas with the customer on project problem solving.	2	5	4.14	.801
E21	The vendor's software development process should fit well with your company's process.	2	5	3.84	.812
E22	The vendor should have operating hours convenient to your business	1	5	3.44	.816

Respondents response of Perception

The average perception (on scale from 1 to 5) of the twenty-two items are rated by respondents in Table 2. The mean value of item is above average. The standard deviation value for all items < 1.0, which means the perception of respondents, is almost the same for all the variables.

Table 2. Descriptive Statistics of Perception

	Items	Min	Max	Mean	SD
P1	Quantic's infrastructure (servers, telecom bandwidth and power supply) is robust enough to ensure continuous progress of the project.	2	5	3.86	.603
P2	Quantic has good support systems (Bug Tracking, Change Request Management, FTP server) for software project development.	2	5	3.59	.659
P3	Quantic's physical facilities are visually appealing.	2	5	3.47	.678
P4	Quantic's employees are well dressed and neat in appearance.	2	5	3.54	.727
P5	Quantic has security policies to secure your business information.	2	5	3.81	.671

P6	Quantic always delivers its services on time.	2	5	3.50	.752
P7	When Quantic promised to do something by a certain time, they did.	2	5	3.78	.732
P8	Quantic was dependable to handle your problem.	2	5	3.73	.738
P9	Quantic told you exactly when services would be performed.	2	5	3.67	.842
P10	Quantic employees were always willing to help you.	3	5	4.02	.632
P11	Quantic employees were never too busy to respond to yours requests.	2	5	3.59	.780
P12	Quantic employees stayed late to work on your high priority issues until they were resolved.	2	5	3.84	.819
P13	Quantic's software industry quality standard (CMMI, ISO 9001) ensures a consistent quality approach for your projects.	2	5	3.51	.740
P14	Quantic has the expertise to work on your business domain.	2	5	3.44	.847
P15	Quantic employees had the technology capacity to do their job well.	2	5	3.68	.776
P16	The behavior of the Quantic employees instilled confidence in yours.	2	5	3.66	.724
P17	You felt safe in your project development with the Quantic employees.	2	5	3.71	.723
P18	Quantic gave you individual attention.	2	5	4.16	.672
P19	Quantic employees understood your specific needs.	2	5	3.77	.750
P20	Quantic employees shared approaches with you on project problem solving.	2	5	3.52	.937
P21	Quantic's software development process fits well with your company process	2	5	3.36	.879
P22	Quantic has operating hours convenient to your business.	1	5	3.03	.894

Reliability analysis

The main purpose for the reliability analysis of the data is to determine the trustworthiness of the data. The reliability analysis is measured by the consistency of the survey data where the indicators are the Item-Total correlation and reliability coefficient Cronbach alpha. The reliability analysis is done in three steps:

In step one; we evaluate the Cronbach alpha and Item-Total correlation of 22 Expectation items. The result shows that the sample is reliable (Cronbach alpha = 0.83), but there are six variables in Table 3 which has the Item-Total correlation value

less than 0.3. The items should be excluded from the list.

Table 3. List of excluded items (Item-Total correlation < 0.3)

	Items	Item-Total correlation
E2	The vendor should have good support systems (Bug Tracking, Change Request Management, FTP server) for software project development	0.17
E4	The vendor's employees should be well dressed and neat in appearance.	0.27
E7	When the vendor promises to do something by a certain time, they should do so.	0.12
E12	The vendor employees should stay late to work on customers high priority issues until they are resolved.	0.15
E13	The vendor should have industry quality standards (CMMI, ISO 9001) to ensure a consistent quality approach for customer projects.	0.01
E17	The customers should feel safe in their project development with the vendor employees.	0.26

In step two, we evaluate the Cronbach alpha and Item-Total correlation of 16 Expectation items. The result shows that the sample is reliable (Cronbach alpha = 0.85) and Item-Total Correlation of all 16 items are bigger than 0.3, thus, indicating that the sample is suitable for factor analysis procedures.

In step three, we evaluate the Cronbach alpha and Item-Total correlation of 16 perception items. Cronbach alpha = 0.8546 and Item-Total Correlation of all 16 items are bigger than 0.3, that mean the sample is reliable for gap between expectation and perception analysis.

Gap between customer expectation and perception

In table 4, the gap score for each statement is calculated as the perception score minus the expectation score. A positive gap score shows that expectations have been met or exceeded and a negative score demonstrates that expectations are not being met. Then the gap scores for each dimension (Di) are assessed, and finally that of the average gap score of service quality (Av)

Table 4. Gap between customer expectation and perception

		Items	P	E	P-E	Di	Av
Tangibles	E1	The vendor's infrastructure (servers, telecom bandwidth and power supply) should be robust enough to ensure continuous progress of the project.	3.86	4.47	-0.61	-0.485	-0.6032
	E3	The vendor's physical facilities should be visually appealing.	3.47	3.83	-0.36		
Reliability	E5	The vendor should have security policies to secure your business information.	3.81	4.57	-0.76	-0.733	
	E6	The vendor should always deliver its services on time.	3.50	4.56	-1.06		
	E8	The vendor should be dependable to handle your problem.	3.73	4.11	-0.38		
	E9	The vendor should tell customers exactly when services would be performed.	3.67	4.32	-0.65		
Responsiveness	E10	The vendor employees should always be willing to help customers.	4.02	4.34	-0.32	-0.487	
	E11	The vendor employees should never be too busy to respond to their customer's requests.	3.59	4.08	-0.49		
Assurance	E14	The vendor should have expertise to work on the customer's business domain.	3.44	4.61	-1.17	-0.837	
	E15	The vendor employees should have the technology capacity to do their job well.	3.68	4.57	-0.89		
	E16	The behavior of the vendor employees should instill confidence in customers.	3.66	4.11	-0.45		
Empathy	E18	The vendor should give customers individual attention.	4.16	4.20	-0.04	-0.474	
	E19	The vendor employees should understand the customer's specific	3.77	4.59	-0.82		

		needs.						
	E20	The vendor employees should share approach ideas with the customer on project problem solving.	3.52	4.14	-0.62			
	E21	The vendor's software development process should fit well with your company's process.	3.36	3.84	-0.48			
	E22	The vendor should have operating hours convenient to your business	3.03	3.44	-0.41			

There is no statement of how a gap score is considered high, especially when using the 1-5 Likert scale system from the previous researches (Parasuraman et al, 1988, Ziethaml et al., 1988, 2000, Karen, 1988, Hoffman & Bateson, 2000). Let's assume that the gap score of under 0.5 (less than 10% oh the highest score of 5) is low, the gap score from 0.5 to 1 is acceptable, from 1 to 1.5 is rather high, from 1.5 to 2 is high, over 2 is too high (the service quality is performed poorly).

In general, we got the negative score for all gaps between perception and expectation on all dimensions, the average gap score is -0.6032, which can be considered acceptable for the overall service quality. The result shows that "Assurance" factor has the highest gap value (- 0.837), then the "Reliability" factor (-0.733), whereas the other three "Responsiveness", "Tangibles", and "Empathy" have almost the same gap value (-0.487, -0.485 and -0.474 respectively).

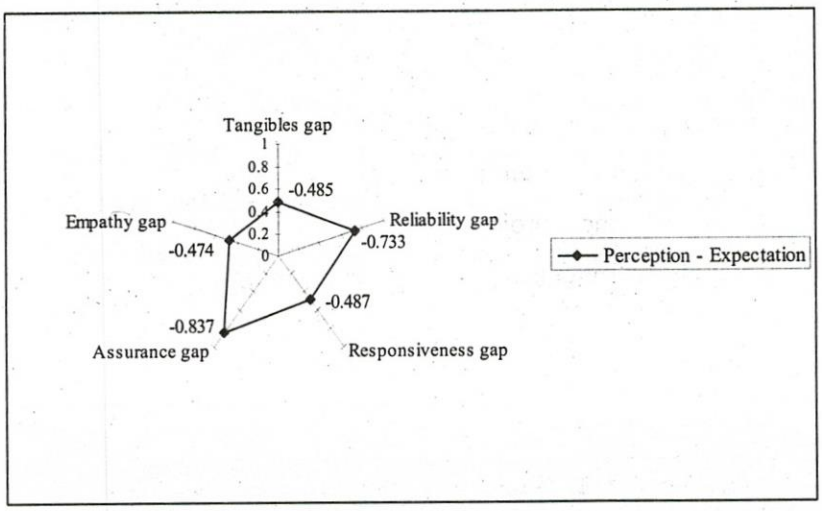

Figure 1. Gaps between perception and expectation on dimension

The radar chart in Figure 1 shows us the gaps between perception and expectation on dimensions in general. From that Figure, it is easy to see that the customers evaluate the service quality of Quantic's software outsourcing not the same throughout the dimensions. They see the dimensions of empathy, tangibles and responsiveness at low gap scores, means that they found out that Quantic's service quality in terms of these dimensions is good enough; whereas Quantic's service quality in terms of assurance and reliability is just acceptable, and needed to be improved. The details of each dimension are shown in the following figures:

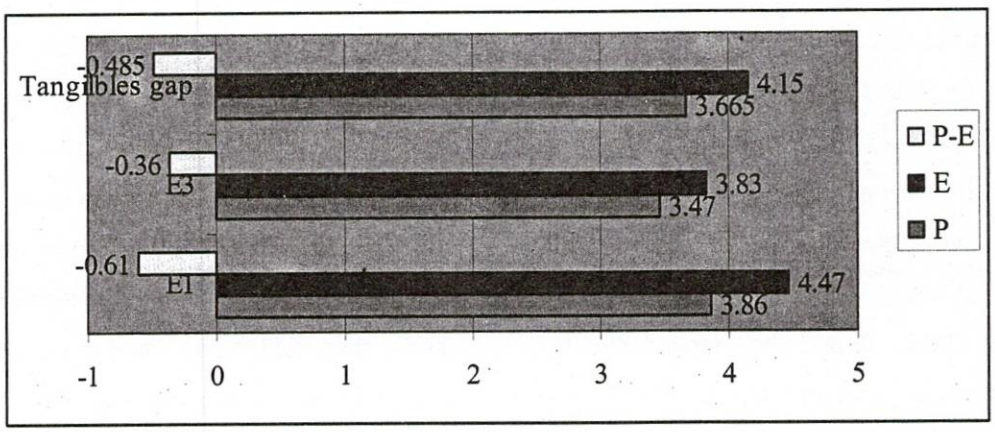

Figure 2: Tangibles gap

From Figure 2, We can recognize that E1 "The vendor's infrastructure (servers, telecom bandwidth and power supply) should be robust enough to ensure continuous progress of the project" contributes not much in the Tangibles gap score (-0.36), but E3 "The vendor's physical facilities should be visually appealing" (-0.61). That means Quantic may have enough infrastructure but it is not visually appealing, and Quantic may pay attention to this finding.

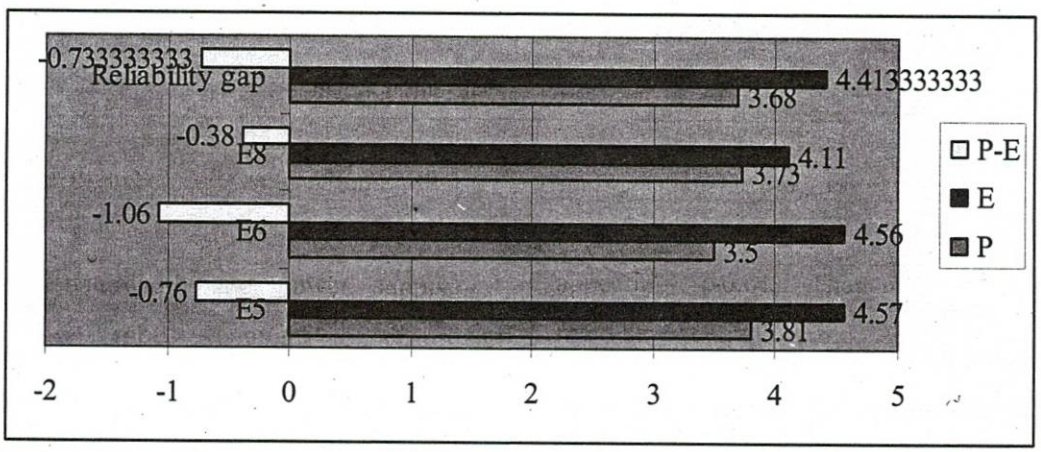

Figure 3: Reliability gap

In the details of Reliability factor, *E6* "The vendor should always delivery its services on time" has very high expectation value (4.56) but the perception is only (3.5), so the gap score is in negative (-1.06) and this is the highest gap in this factor, the second gap is E5 "The vendor should have security policies to secure your business information" (-0.76). E8 "The vendor should be dependable to handle your problem" has a lowest gap score (-0.38). This shows that the deliver time is the weakness point of Quantic in the eyes of customers, then the security for information. We also need to pay attention in the high sores of Expectation in this factor, it means that the customer expect much of the service.

Figure 4 is about Responsiveness factor, in which the biggest gap score is E9 "The vendor should tell customers exactly when services would be performed" (-0.65), then E11 "The vendor employees should never be too busy to respond to their customer's requests" (-0.49), and the last is E10 "The vendor employees should

always be willing to help customers" (-0.38). It shows that Quantic's responsiveness to customers' requests is acceptable in general, except the promised time of performing services.

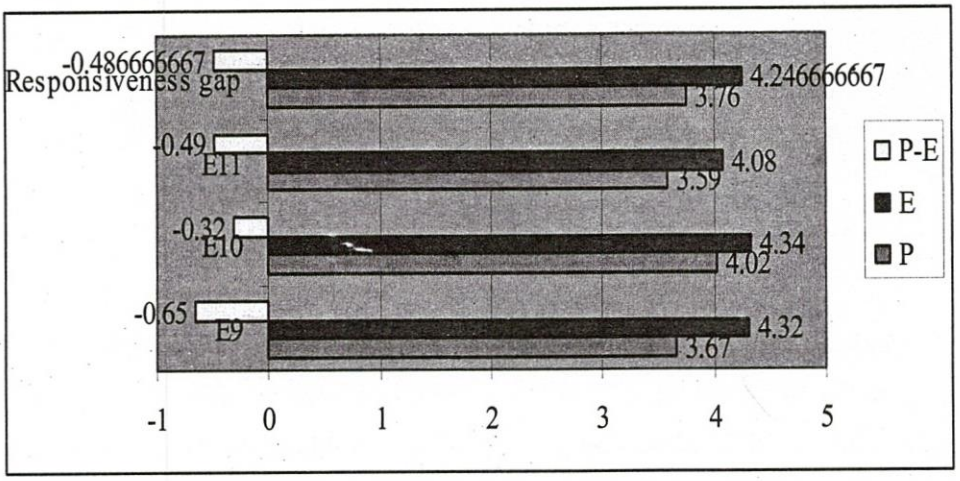

Figure 4: Responsiveness gap

From Figure 5, we got the negative score for all three variables in this dimension, in which two variables have the gap score above the average score (-0.8333) and the biggest gap score on E14 "The vendor should have expertise to work on the customer's business domain" (-1.17). E15 "The vendor employees should have the technology capacity to do their job well" (-0.89) is also the high gap and it does not meet the customer expectation. The only low score variable is E16 "The behavior of the vendor employees should instill confidence in customers" (-0.45). This shows that Quantic's people does not meet well the customers' expectation, except building them a kind of confidence. This warns Quantic of the people factor in its activities, whether they have to hire the expertise people or they need to train their current staff up to the point that can satisfy the customers' requests. We also need to understand that this factor happen to have the highest P – E gap score overall, so it should become the critical point of Quantic's service quality.

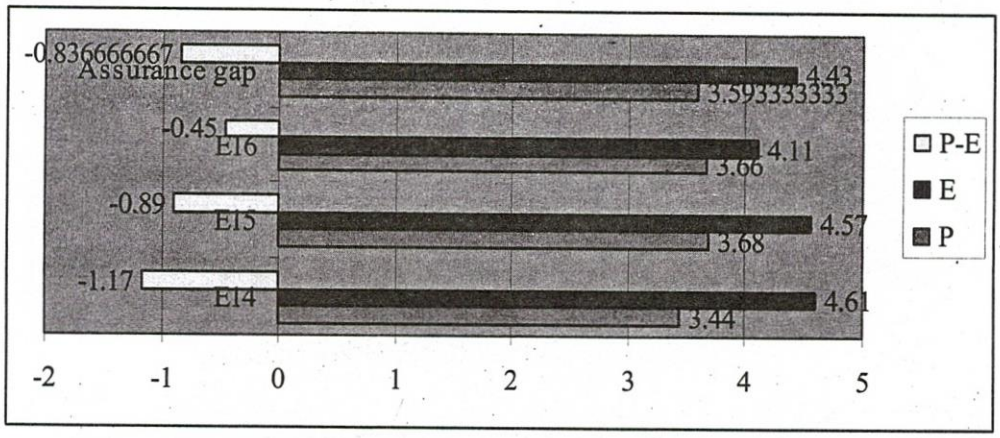

Figure 5: Assurance gap

Figure 6 indicates the average Empathy gap score is rather low (-0.474), in which the biggest gap is E19 "The vendor employees should understand the customer's specific needs" (-0.83) whereas the score for expectation is quite high (4.59) shows that it is the important and differentiated point in the software outsourcing service that Quantic has not done well; then E20 "The vendor employees should share approach ideas with the customer on project problem solving" (-0.62). The two E21 "The vendor's software development process should fit well with customer company's process" (-0.48) and E22 "The vendor should have operating hours convenient to your business" (-0.41) get low gap scores, and also low score in both expectation and perception may show that they are not the important points in the customers view of service quality. Especially, we have a very low gap score in this dimension, that variable E22 "The vendor should have operating hours convenient to your business" (-0.44) indicates that people works compatibly in terms of time around the world.

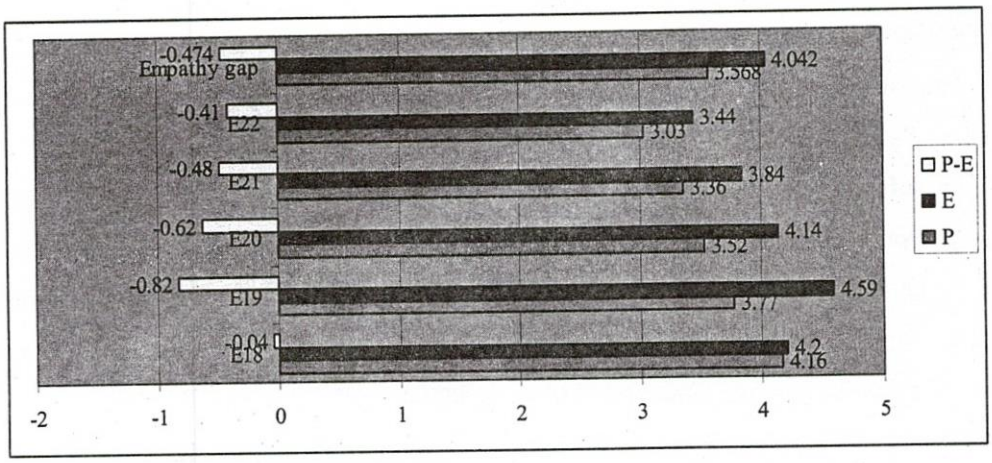

Figure 6: Empathy gap

4. RECOMMENDATIONS AND CONCLUSION

Recommendations

Given today's competitive environment and the current impact of the economic recession, we believe it is appropriate for Quantic top management to seriously examine their current service quality. In order to approach customers' expectations, we recommend Quantic top management to take the advantage of the research results to clearly set up the service quality improvement program in the company. The following suggestions need to be considered to improve Quantic service quality:

- **Firstly, the staff should be well trained**

It is noted that the highest gap score belongs to the Assurance dimension, in which all the variables are people-related, in which the highest P – E score (on all 16 variables) belongs to E14 "The vendor should have expertise to work on the customer's business domain". So, the company should pay attention not only to their in-house training program, but also to the customer business domain, and the way their staff communicate and serve the customers.

- **Secondly, the company should deliver the service better**

It is recognize from the analysis that the runner up gap score belongs to Reliability dimension, in which all variables are delivery-related, in which the runner up P – E score (on all 16 variables) belongs to E6 "The vendor should always deliver its services on time". The company should have to improve the process to approach customers' expectation of timing and security of information.

Conclusions

The aim of this study was to explore the customer's expectation on the service quality in software outsourcing vendor, then to compare to the current service quality at Quantic, and finally provide suggestions for Quantic's management to improve Quantic's service quality in software outsourcing services. The questionnaire is designed based on SERVQUAL - the most popular and widely used instrument for measuring functional quality. The gap between expectation and perception has been examined and presented.

From 22 original variables following Parasuraman study, the exploratory analysis excluded 6 variables, then the service quality of software outsourcing at Quantic is conducted from the viewpoint of dimension-by-dimension descriptive analysis. The results reveal that all dimensions are at negative gap scores, in which three- Tangibles, Responsiveness, and Empathy- are low, whereas the other two- Reliability and Assurance- are acceptable. The research comes up with the recommendations that could help the company to improve its service quality in order to reach customers' expectations: to train the staff well and to deliver service better.

Obviously, the descriptive analysis which is used in this research is not a strong method to have a better result. Then, using SERVQUAL model which is criticized by Robison (1999)- in terms of areas and nature of disagreements-, and by Francis (1995)- in terms of theoretical and operational matters-, is not a perfect solution. So, the analysis in this research opens the air for the deeper study of using other models and or other methods to measure the service quality of software outsourcing at Quantic.

ĐO LƯỜNG CHẤT LƯỢNG DỊCH VỤ THUÊ NGOÀI PHÁT TRIỂN PHẦN MỀM TẠI QUANTIC Co., Ltd - PHÂN TÍCH SO SÁCH CÁC THANG ĐO

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TÓM TẮT: *Việc đánh giá chất lượng dịch vụ trong ngành công nghiệp phần mềm vẫn chưa được coi trọng, mặc dù công nghệ vi tính phát triển nhanh và đa dạng trong những năm gần đây. Nghiên cứu này nhằm vào việc khảo sát nhận thức và kỳ vọng của khách hàng về dịch vụ mà Quantic cung cấp, bằng việc sử dụng công cụ nghiên cứu thị trường gọi là SERVQUAL, dưới dạng so sánh các thang đo. Mẫu 137 khách hàng được phỏng vấn bằng bảng câu hỏi về nhận thức và kỳ vọng dịch vụ nhằm nhận diện chất lượng dịch vụ. Phân tích mô tả cho thấy rằng khoảng cách chất lượng dịch vụ ở hai thang đo- Năng lực phục vụ và Độ tin cậy- cao hơn so với khoảng cách này ở các thang đo khác. Điều đó đề xuất cho Quantic một số chương trình cần làm nhằm đạt đến kỳ vọng của khách hàng*

Từ khóa: *chất lượng dịch vụ, phát triển phần mềm, so sánh các thang đo, Quantic*

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