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Service Gap Deployment (SGD): a framework to link quality gaps to service activities

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Abstract

This paper presents the Service Gap Deployment (SGD), a new method to prioritize *crucial to quality* activities of a service that does not completely satisfy customer expectations. In the SGD, service activities (SAs) are related to gaps between customer expectations and perceptions so as to identify SAs that may need a redesign or improvement in order to satisfy customer needs. The method, which expands the Gaps Model of Service Quality by Parasuraman et al. (1985), supports the design of evolutionary and sustaining improvements of the service parts that generate customer dissatisfaction. Specifically, the SGD introduces three major contributions: (i) it creates a map relating service dimensions to SAs; (ii) it highlights *crucial to quality* activities and (iii) it allows a focused improvement of the analysed service. The description is supported by an excerpt from a real application example, concerning the prioritization of *crucial to quality* SAs of an airport luggage delivery service.

Keywords: *Gap Model; Service Quality; SERVQUAL; Quality Function Deployment; Service Activities; Service Gap Deployment*

1. Introduction

The economies of the most advanced nations are undoubtedly dominated by services. According to the latest edition of the world development report, respectively the 74% of Euro area and the 70% of world Gross Domestic Product (GDP) in 2012 is due to services (The World Bank 2015). Despite this evidence, there is still little focus within companies, governments and scholars on service excellence, research or innovation if compared to the focus on tangible goods and technologies (Bitner, Zeithaml et al. 2010; Ostrom, Parasuraman et al. 2015).

For this reason, academics and practitioners highlighted the need for techniques, tools, metrics and frameworks to support research and innovation in services (IfM and IBM 2007).

This paper tries to expand the Gaps Model of Service Quality, a framework developed by Parasuraman et al. (Parasuraman, Zeithaml et al. 1985; Zeithaml, Parasuraman et al. 1990). According to this model, the quality of a generic service can be assessed on the basis of how much service perceptions are in line with customer expectations. In detail, this framework theorizes the existence of five different macro-gaps that – if closed – ensure the adherence of the provided service to customer expectations:

- Customer gap. It represents the difference between customer expectations and perceptions of service performance.
- Gap 1: the listening gap. It is the difference between customer expectations of service and company understanding of those expectations.
- Gap 2: the design and standards gap. This gap is the deviation between the company perception of customer expectations and the actual service design.
- Gap 3: the service performance gap. It is the discrepancy between customer-driven service design and standards and actual service delivery.
- Gap 4: the communication gap. It is the difference between service delivery and what is communicated to customers about the service.

A schematic representation of the gap model is given in Figure 1. The centrepiece of the model is the customer gap, i.e. the difference between customer expectations and perceptions of service performance.

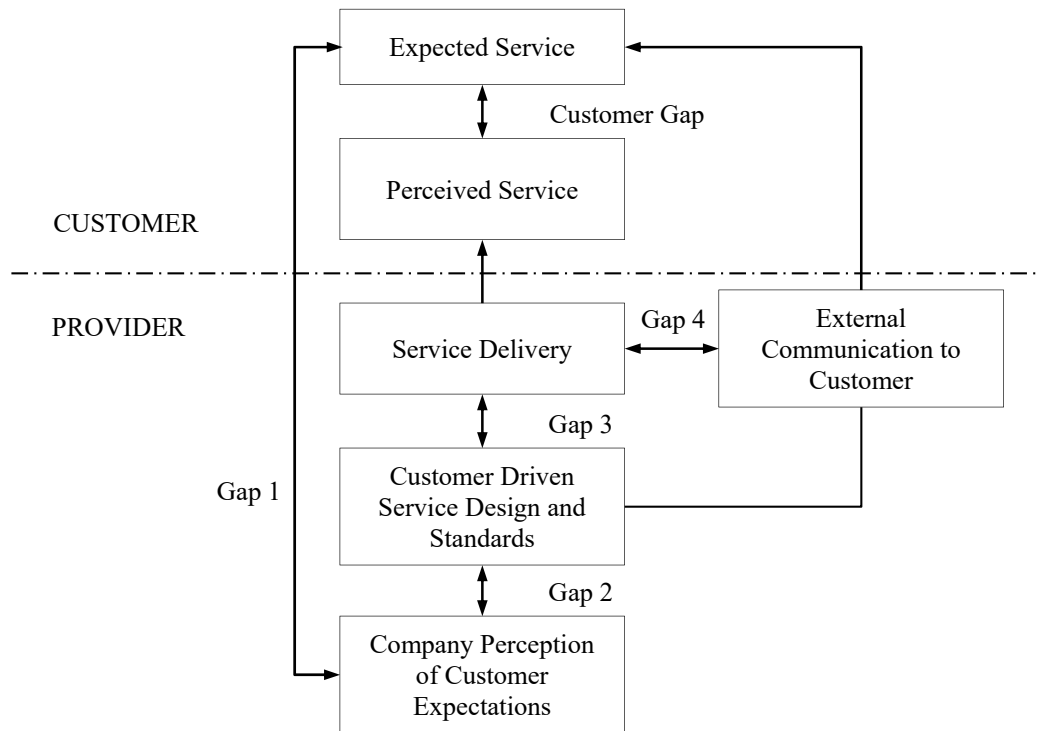


Figure 1. Gaps model of service quality (Bitner, Zeithaml et al. 2010).

Since its introduction, the model has been widely used across companies to formulate strategies to deliver quality services aimed at customer satisfaction. The model also aroused the interest of researchers: practitioners and academics have focused on both customer expectations and perceptions (Zeithaml, Berry et al. 1993; Zeithaml, Berry et al. 1996; Rust and Oliver 2000; Dahiyat, Akroush et al. 2011), defining metrics for quantifying them (Brady and Cronin Jr 2001), and studying their effects (Boulding, Kalra et al. 1993; Vasumathi and Subashini 2015). In particular, a number of strategies have been proposed to deal with each of the theorized gaps, with particular focus on the customer gap (Berry, Zeithaml et al. 1985; Zeithaml and Bitner 2003; Bitner, Zeithaml et al. 2010).

Although a significant part of the literature has focused on *how* to intervene to close potential gaps, the authors believe that there may be still a lack regarding the *where* to intervene: when the service is complex and composed of a significant number of activities, it may not be trivial to identify which service activities (SAs) – or part of the service process – need to be revised or redesigned to meet customer needs.

The purpose of this paper is to present the Service Gap Deployment (SGD) method. Similarly to Quality Function Deployment the SGD relates the evaluation of a gap to SAs, with the ultimate purpose of identifying *crucial to quality* activities, i.e. those activities that are strategic to achieve a quality service (Franceschini, Galetto et al. 2015). *Crucial to quality* activities can be then modified

or redesigned to close the gap so as to meet the customer need. To this purpose a variety of existing design tools can be used, such as QFD, FMEA, simulation tools, etc. For this reason, the management of this phase is beyond the aim of this paper. Although the SGD has been designed for the application to the customer gap, nothing prevents its use for any of the other provider gaps.

The remainder of the paper is structured into 5 sections. Section 2 recalls the basics of the SERVQUAL model. After introducing and defining the problem in Section 3, Section 4 presents the Service Gap Deployment. Finally, Section 5 discusses a practical application of the SGD to the luggage delivery service in a European airport. The concluding section summarizes the original contributions of this paper, its implications, limitations and possible suggestions for future research.

2. Gap assessment: basics of the SERVQUAL model

In general, a service can be defined as a series of activities, which takes place in the interaction between customer and service provider, and that comes as a solution to the problems of the customer. Services and related activities are typically delivered in the same moment they are consumed by the customer.

This model offers an integrated view of the consumer-company relationship.

Probably the most significant effort to model the interaction between service customer and provider was made by Parasuraman, Zeithaml and Berry (Berry, Zeithaml et al. 1985; Parasuraman, Zeithaml et al. 1985; Zeithaml, Parasuraman et al. 1990; Parasuraman, Berry et al. 1991; Zeithaml, Berry et al. 1993). The authors identified 10 key determinants, later collapsed into 5 dimensions, for the assessment of service quality (and of the Customer Gap):

- 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 knowledge and courtesy of employees and their ability to convey trust and confidence;
- Empathy: the provision of caring, individualized attention to customers;

The same authors also defined a tool – named SERVQUAL – with the aim of operationalizing the measurement of service quality with particular reference to the aforementioned five dimensions.

The underlying idea is that the quality of a service can be related to the gap between customer expectations and perceptions concerning the service under investigation (Customer Gap).

The SERVQUAL is a multi-item questionnaire constructed to investigate all the components and the key features of a service. It is composed of two parts. The first one targets the evaluation of the

five dimensions of a service from the point of view of customer perceptions. The second one is related to customer expectations. For each of the two parts of the questionnaire, the evaluator is called to provide an assessment of 22 key service features on a 7 levels ordinal scale (see Table 1). For the generic i -th item, the assessment requires two indications: (i) a score p_{ij} on the perception that the j -th evaluator has of the i -th service key feature, and (ii) a score e_{ij} concerning its expectations on the same feature. The difference between the two scores ($g_{ij} = e_{ij} - p_{ij}$) provides an indication of the gap for the considered feature. For each of the five dimensions (or alternatively for each of the key features), the evaluator is also asked to define a relevant importance, i.e. a score between zero and one that expresses the significance of the specific service dimension (or key feature). Table 1 reports a schematic view of the SERVQUAL model, also providing (i) a short definition of each of the 22 service key features and (ii) their distribution among the 5 service dimensions.

Tab. 1. Detail of the dimensions and key features in the SERVQUAL model.

Service Dimension	Definition	Key feature/item
Customer gap	Tangibles the appearance of physical facilities, equipment, personnel and communication materials;	1.Up-to-date equipment
		2. Visually appealing facilities
	Reliability the ability to perform the promised service dependably and accurately	3. Well dressed and neat appearing of employees
		4. Appearance of physical facilities in keeping with the type of services provided
		5. Things by the promised time
Responsiveness the willingness to help customers and to provide prompt service	6. Sympathetic and reassuring when customers have problems	
	7. Dependable	
	8. Services by the promised time	
Assurance the knowledge and courtesy of employees and their ability to convey trust and confidence	9. Accurate records	
	10. Clear when services will be performed	
Empathy the provision of caring, individualized attention to customers	11. Provision of prompt service	
	12. Employees willing to help	
	13. Accessibility of staff when needed	
	14. Feeling security and safety in receiving care and communication with staff	
	15. Feeling safe in transactions	
	16. Courteous and polite behaviour of employees towards customers	
	17. Proper know how to satisfy customer needs	
	18. Giving individual attention to each customer	
	19. Employees give personal attention to customers	
	20. Employees know customers' interests	
	21. The company has customers' best interests at heart	
	22. Understanding of the specific customers time needs	

According to the original version of the SERVQUAL, the “quality of service along each of the five dimensions can be assessed across all customers by averaging their scores on statements making up the five dimension” (Zeithaml, Parasuraman et al. 1990). Then an overall measure of service quality is obtained by averaging the scores for the five dimensions multiplied by the relevant importances (Brown and Swartz 1989; Carman 1990; Parasuraman, Berry et al. 1991).

The SERVQUAL model and particularly the aforementioned aggregation approach arouse several criticisms, suggestions for improvement and slight modifications to suit different applications (Brown, Churchill Jr et al. 1993). Despite these criticisms, the large number of applications is a proof of the attention that it received (Carrillat, Jaramillo et al. 2007; Shi and Wang 2011; Zhu, Ramanathan et al. 2011; Mashhadiabdol, Sajadi et al. 2014; Cho, Kim et al. 2015; Yin, Huang et al. 2015).

3. Description of the Problem

Determining *crucial to quality* activities in a generic service is not a trivial task mainly for the following reasons: (i) the service can be complex, consisting of a large number of activities more or less related to each other; (ii) different SAs may have an impact on the same service dimensions and (iii) the same SA may have an impact on multiple service dimensions.

The problem herein discussed is to determine *crucial to quality* SAs when an assessment of the quality of a service is available in terms of differences between customers’ expectations and perceptions.

A general formulation of this problem can be the following. Let us consider:

- a generic service composed of a series of N activities, i.e. $\mathbf{S} = \{SA_1, SA_2, \dots, SA_N\}$.
- an assessment of the Customer Gap of a service given in the form of a vector, i.e. $\mathbf{G} = [g_1, g_2, \dots, g_M]$. The individual gap (g_i) can be either related to 5 service dimensions or to the 22 key features of SERVQUAL. In order to be as general as possible, hereafter we will confuse the concepts of *service dimension* and *key feature*, defining as *assessment dimensions* the M aspects of the gap assessment. Gap (g_i) is intended as an indicator of central tendency (e.g. mode, median or average) of the individual gap provided the evaluators on the i -th assessment dimension.
- A set of importances related to M assessment dimensions, $\mathbf{\Omega} = [\omega_1, \omega_2, \dots, \omega_M]$ with $\omega_i \in [0,1]$.

It is worth noting that the elements of \mathbf{G} are defined on a cardinal scale as for the definition in SERVQUAL.

The goal of the method is to establish a prioritization of the *SAs* specifying the order in which they affect the quality of the service under investigation. Hence, given two *SAs* – say SA_p and SA_q – only three possible relations can hold: $SA_p > SA_q$, $SA_q > SA_p$ and $SA_p \sim SA_q$, where symbols “>” and “~” respectively mean “more *crucial to quality*” and “equally *crucial to quality*”.

4. Service Gap Deployment

The relationships between *SAs* and assessment dimensions can be formalized by means of a relationship matrix (**R**). This matrix, which is similar to those used in the Quality Function Deployment (Franceschini 2001; Franceschini, Galetto et al. 2015), has the aim of modelling these relationships by means of a symbolic encoding.

Its evaluation is entrusted to a cross-functional team of service experts (Franceschini 2001) that, for each element in the matrix, tries to provide an answer to the question: to what extent the *j*-th service activity (SA_j) is influenced by the *i*-th assessment dimension (AD_i)?

The answer to this question is provided in terms of a correlation coefficient (r_{ij}) expressed on an ordinal scale and codified in specific conventional symbols. Although different choices are possible, we propose the use of a 4-level ordinal scale as described in Table 2 (Franceschini, Galetto et al. 2015).

Tab. 2. Symbols used to specify correlation factors (r_{ij}). The numerical conversion of correlation factors is required to apply the Independent Scoring Method (Akao 1988).

Symbol (r_{ij})	Meaning	Numerical conversion (r_{ij}^*)
●	Strong relationship	9
△	Medium relationship	3
○	Weak relationship	1
-	Null relationship	0

As an explanatory example, consider a simple hypothetical service composed of four activities assessed on 5 equally important ($\omega_i = 1/5$) assessment dimensions. Table 3 reports the relationship matrix for the exemplified service codified according to the aforementioned convention.

Tab. 3. Example of relationship matrix for an hypothetical service composed of four activities assessed on 5 equally important assessment dimensions.

	Ω	G	SA_1	SA_2	SA_3	SA_4
AD_1	0.2	0		○		○
AD_2	0.2	2		●		
AD_3	0.2	0	○			○
AD_4	0.2	1	●		△	●
AD_5	0.2	1			○	

According to this example, SA_1 is related strongly to AD_4 and weakly to AD_3 . SA_2 is related strongly to AD_2 and weakly to AD_1 . SA_3 has a medium impact on AD_4 and a weak relationship with AD_5 . Finally SA_4 is strongly related to AD_4 and weakly to AD_1 and AD_3 . The assumed assessment of the Customer Gap is $G = [0,2,0,1,1]$.

The elements of the general problem can be formalized as in Table 4.

Tab. 4. Schematic representation of a general relationship matrix.

	Ω	G	SA_1		SA_j		SA_N
AD_1	ω_1	g_1	r_{11}	...	r_{1j}	...	r_{1N}
\vdots	\vdots	\vdots	\vdots	\ddots	\vdots	\ddots	\vdots
AD_i	ω_i	g_i	r_{i1}	...	r_{ij}	...	r_{iN}
\vdots	\vdots	\vdots	\vdots	\ddots	\vdots	\ddots	\vdots
AD_M	ω_M	g_M	r_{M1}	...	r_{Mj}	...	r_{MN}

As it is defined, the problem of establishing a prioritization of SAs is similar to that of ranking technical characteristics in QFD (Akao 1988). As a first approach, the Independent Scoring Method is proposed to face this problem (Akao 1988).

Operatively, two steps are required:

1. correlation factors are converted into equivalent numerical values. The most common option is described in Table 2.
2. the level of importance (y_j) related to each SA_j is then determined as follows:

$$y_j = \sum_{i=1}^M \omega_i g_i r_{ij} \cdot \quad (1)$$

A ranking of the SAs is then possible according to the relevant level of importance: *crucial to quality* activities are those with the highest values of y_j .

Going back to the example in Table 3, the proposed method produces the following levels of importance related to the four SAs:

$$\begin{cases} y_1 = 0 \cdot 0.2 \cdot 1 + 1 \cdot 0.2 \cdot 9 = 1.8 \\ y_2 = 0 \cdot 0.2 \cdot 1 + 2 \cdot 0.2 \cdot 9 = 3.6 \\ y_3 = 1 \cdot 0.2 \cdot 3 + 1 \cdot 0.2 \cdot 1 = 0.8 \\ y_4 = 0 \cdot 0.2 \cdot 1 + 0 \cdot 0.2 \cdot 1 + 1 \cdot 0.2 \cdot 9 = 1.8 \end{cases} \quad (2)$$

which result in the following prioritization: $SA_2 > SA_1 \sim SA_4 > SA_3$.

Other approaches are possible in order to obtain a ranking of the SAs (Franceschini, Galetto et al. 2015). However the adaptation of the Independent Scoring Method is herein preferred due to its simplicity and robustness (Franceschini 2001).

5. Application example

This section exemplifies the application of the SGD to a luggage delivery service in a European airport. The example herein proposed is an excerpt from a more complex case study. It is intended solely as an example of how the SGD works. Sections 5.1 and 5.2 refer to the gap data collection and service representation, respectively. Section 5.3 shows the details of the relationship matrix, while the results of SGD are presented in Section 5.4.

5.1 Gap Data Collection

A sample of thirty respondents – i.e., regular air passengers – was selected to assess the service on questionnaire designed according to the guidelines of the SERVQUAL model. Table 5 shows the gap average values for each of the 22 SERVQUAL key features. In this excerpt the authors considered the gap average values to ensure adherence to the original model SERVQUAL. Alternatively, the median value would have been an appropriate central tendency indicator to avoid the effect of extreme evaluations (outliers). In this analysis service dimensions are assumed to be equally important.

Tab. 5. Results of the assessment of the luggage delivery service. The table shows the average values of the gaps referred to the SERVQUAL key features.

Dimension	Key feature/item	Gap average value (g_i)	Importances (ω_i)
Tangibles	1. Up-to-date equipment	0.1	1/20
	2. Visually appealing facilities	0.1	1/20
	3. Well dressed and neat appearing of employees	0.2	1/20
	4. Appearance of physical facilities in keeping with the type of services provided	0	1/20
Reliability	5. Things by the promised time	1	1/25
	6. Sympathetic and reassuring when customers have problems	0	1/25
	7. Dependable	0.1	1/25
	8. Services by the promised time	1	1/25
	9. Accurate records	0.3	1/25
Responsiveness	10. Clear when services will be performed	0.7	1/20
	11. Provision of prompt service	1	1/20
	12. Employees willing to help	0.3	1/20
	13. Accessibility of staff when needed	0.4	1/20
Assurance	14. Feeling security and safety in receiving care and communication with staff	0.5	1/20
	15. Feeling safe in transactions	1.4	1/20
	16. Courteous and polite behaviour of employees towards customers	0.1	1/20
	17. Proper know how to satisfy customer needs	0.1	1/20
Empathy	18. Giving individual attention to each customer	0	1/25
	19. Employees give personal attention to customers	0.1	1/25
	20. Employees know customers' interests	0.3	1/25
	21. The company has customers' best interests at heart	0.4	1/25
	22. Understanding of the specific customers time needs	0.4	1/25

A qualitative analysis of the results suggests some considerations: (i) the gap average values are all greater than or equal to zero, which means that the service is never overcoming customers' expectations; (ii) a few key features have a significantly positive gap value, which means that the service is well designed but with few deficiencies in specific features (key feature 10 and 15).

The consistency of the results was verified by observing the distribution of the assessments for each key feature. Specifically, distributions were checked to be unimodal to verify the interpretation correctness of the questions in the questionnaire. As an example, Figure 2 shows the distribution of gap assessments for key feature 10 ("Clear when services will be performed") and 15 ("Feeling safe in transaction").

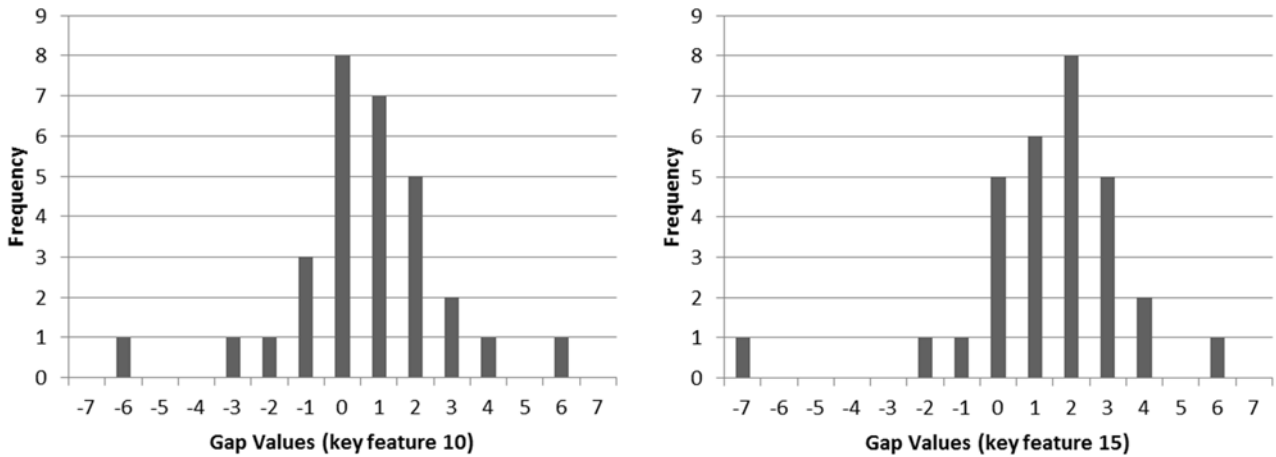


Figure 2. Distribution of gap assessments for for key feature 10 (“Clear when services will be performed”) and 15 (“Feeling safe in transaction”).

5.2 Service representation

The process herein analysed is the baggage delivery service in an airport. The process begins with the docking of the airplane once landed and ends when the luggage is claimed by the owner.

The process has been broken down into its most basic activities. Figure 3 presents a synthetic description of the SAs, also showing their structural connections.

Summarizing the process, the authors decided to “condense” the activities of customer service assistance into a single macro activity.

Step	Phase	Short description	Following Step
0	START	Plane docked	
1	SA ₁	Opening tailgate hold	2
2	SA ₂	Baggage unloading on the Baggage Handling System	3
3	CHECK 1	<i>Is tailgate hold empty?</i>	YES 5 NO 4
4	SA ₃	Require additional Baggage Handling System	2
5	SA ₄	Transport to the luggage warehouse	6
6	SA ₅	Selection of the carousel	7
7	SA ₆	Luggage sorting	8
8	SA ₇	Baggage loading on the carousel	9
9	SA ₈	Baggage collection	10
10	CHECK 2	<i>Are all luggage collected?</i>	YES 11 NO 12
11	CHECK 3	<i>Is any luggage missing?</i>	YES 13 NO 14
12	SA ₉	Store unclaimed luggage in luggage warehouse	14
13	SA ₁₀	Customer service assistance	14
14	END	End	

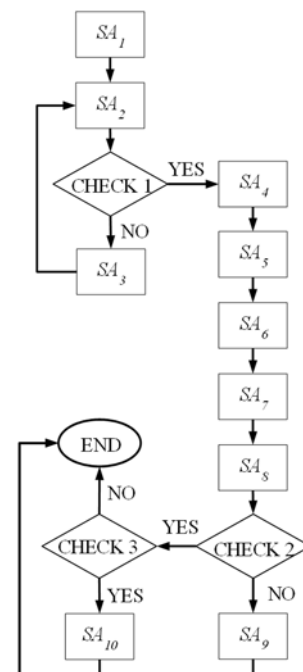


Figure 3. Activities of a baggage delivery service. The connection among the activities is shown in the last column of the table.

5.3 Relationship Matrix

The cross functional team, which was composed by two service managers and a focus-group, built

the relationship matrix reported in Table 6. Consistently with the legend of Figure 4, circles with thick and thin edges respectively denote strong and weak relationships, while a triangle represents a medium relationship.

Tab. 6. Relationship matrix of a baggage delivery service.

		G	SA_1	SA_2	SA_3	SA_4	SA_5	SA_6	SA_7	SA_8	SA_9	SA_{10}
Tangibles	AD_1	0.1	○	○			○		○			
	AD_2	0.1										△
	AD_3	0.2										○
	AD_4	0	○	○						○		
Reliability	AD_5	1					○					
	AD_6	0										○
	AD_7	0.1										○
	AD_8	1					○			○		
	AD_9	0.3										△
Responsiveness	AD_{10}	0.7					○					
	AD_{11}	1	○	○	○	○	○	○	△			
	AD_{12}	0.3										○
	AD_{13}	0.4										○
Assurance	AD_{14}	0.3										○
	AD_{15}	2.4		△				△		○	△	
	AD_{16}	0.1										○
	AD_{17}	0.1										○
Empathy	AD_{18}	0										○
	AD_{19}	0.1										○
	AD_{20}	0.3										○
	AD_{21}	0.1										○
	AD_{22}	0.2										○

5.4 Result analysis and improvement actions

The level of importance (y_j) was calculated according to Eq. (2). Table 7 shows the obtained results for each SA.

Tab. 7. Level of importance related to each SA.

	SA_1	SA_2	SA_3	SA_4	SA_5	SA_6	SA_7	SA_8	SA_9	SA_{10}
Level of importance	0.06	0.82	0.05	0.45	1.49	0.81	0.16	1.44	0.36	0.97

According to the obtained levels of importance, the resulting most crucial activities are:

- SA_5 : Selection of the carousel. In this phase the Baggage Handling System (BHS) (i) assigns the carousel for the luggage delivery and (ii) sends the information to the monitors in the arrival terminal. The monitors display to service users the Scheduled Time of Arrival (STA),

flight code, the departure airport, the landing time and the carousel number for the baggage claim.

- *SA₈*: Baggage collection. In this phase service users are required to retrieve their luggage from the conveyor belt. Then, they are free to leave the terminal.

Looking at the contributions to this result, it is clear that *SA₅* has a strong impact on *AD₁₀* (Clear when services will be performed) and *AD₁₁* (Provision of prompt service). Conversely *SA₈* impacts on *AD₁₅* (Feeling safe in transactions).

Discussing these results with a focus group of users, the cross functional team brought two actions aimed at the improvement of the aforementioned *SAs*:

- *SA₅*: the team suggested to associate the carousel number for the baggage claim with the estimated wait time. This change has been approved and implemented (see Figure 4).
- *SA₈*: the critical issue regarding this activity is that the passengers are not subject to any control after the baggage claim. For this reason, the team suggested the introduction of a further control phase aimed at verifying the matching between passenger and baggage relying on the Quick Response (QR) code on the luggage label and the passenger ticket.

ARRIVALS					11:03
STA	Flight	From	Belt	Status	
09 ⁴⁵	9W121	London Heatrow	9	Arrived 09:57	
10 ⁰⁵	AI348	Mumbai	12	Arrived 10:24	
10 ²⁵	BG097	Dhaka	10	Landed	
10 ³⁵	TG323	Bankok	8	Arrived 10:20	
10 ⁴⁵	ABF45	London Heatrow	13	Arrived 10:57	
10 ⁵⁰	AK027	Katmandu	7	Landed	
11 ⁰⁵	JKFGR	Katmandu	11	Landed	
11 ¹⁵	TM2710	New York JFK	9		
11 ³⁵	TR645	Bahrain	12		
11 ⁵⁰	HB789	Lahore	14		
12 ⁰⁰	9KWRT	Frankfurt	11		
12 ²⁵	GH123	London Heatrow	13		

ARRIVALS						11:03
STA	Flight	From	Belt	Status	Wait time	
09 ⁴⁵	9W121	London Heatrow	9	Arrived 09:57	Delivered	
10 ⁰⁵	AI348	Mumbai	12	Arrived 10:24	03 min	
10 ²⁵	BG097	Dhaka	10	Landed	Delivered	
10 ³⁵	TG323	Bankok	8	Arrived 10:20	Delivered	
10 ⁴⁵	ABF45	London Heatrow	13	Arrived 10:57	05 min	
10 ⁵⁰	AK027	Katmandu	7	Landed		
11 ⁰⁵	JKFGR	Katmandu	11	Landed		
11 ¹⁵	TM2710	New York JFK	9			
11 ³⁵	TR645	Bahrain	12			
11 ⁵⁰	HB789	Lahore	14			
12 ⁰⁰	9KWRT	Frankfurt	11			
12 ²⁵	GH123	London Heatrow	13			

Figure 4. Screenshot of the monitor in the arrival terminal: (a) before and (b) after the suggested change.

Additional tests are currently undergoing to check if the proposed solutions have brought the desired effect on customer satisfaction.

6. Conclusions and future developments

The most common approach to evaluate service quality is to assess the customer gap, i.e. the gap between customer expectations and perceptions. To this end, Parasuraman et al. (1985) defined the Gaps Model of Service Quality, a framework that identifies the key gaps that make up the customer gap. The same authors also defined a tool - named SERVQUAL - with the aim of operationalizing the measurement of the customer gap. Although the tool is able to provide a quantification of the

customer gap, it is not directly able to provide guidance on where to act to close it in order to satisfy customer expectations.

This paper presents the Service Gap Deployment (SGD), a new tool able to prioritize *crucial to quality* activities of an existing service when it does not satisfy customer expectations. The SGD expands the Gaps Model of Service Quality, integrating with the SERVQUAL and introducing three major contributions:

- it formalizes a map – in the form of a relationship matrix – relating assessment dimensions to the activities of the relevant service;
- it highlights *crucial to quality* activities, also determining a ranking among SAs;
- it allows a focused improvement of the existing service.

Its main limitation is that the method is suitable for dealing only with evolutionary and sustaining service improvements, i.e. those improvements that do not require a complete redesign of the whole service. Future development of this research will try to address this issue, integrating the SGD in a more structured framework also able to assist the redesign of the whole service.

7. References

- Akao, Y. (1988). Quality Function Deployment. Cambridge, MA, Productivity Press.
- Berry, L. L., V. A. Zeithaml and A. Parasuraman (1985). "Quality counts in services, too." Business Horizons **28**(3): 44-52 DOI: 10.1016/0007-6813(85)90008-4.
- Bitner, M., V. Zeithaml and D. Gremler (2010). Technology's Impact on the Gaps Model of Service Quality. Handbook of Service Science. P. P. Maglio, C. A. Kieliszewski and J. C. Spohrer, Springer US: 197-218.
- Boulding, W., A. Kalra, R. Staelin and V. A. Zeithaml (1993). "A dynamic process model of service quality: from expectations to behavioral intentions." Journal of marketing research **30**(1): 7-27.
- Brady, M. K. and J. J. Cronin Jr (2001). "Some new thoughts on conceptualizing perceived service quality: A hierarchical approach." Journal of Marketing **65**(3): 34-49 DOI: 10.1509/jmkg.65.3.34.18334.
- Brown, S. W. and T. A. Swartz (1989). "A gap analysis of professional service quality." The Journal of Marketing **53**(2): 92-98.
- Brown, T. J., G. A. Churchill Jr and J. P. Peter (1993). "Improving the measurement of service quality." Journal of retailing **69**(1): 127-139 DOI: 10.1016/s0022-4359(05)80006-5.
- Carman, J. M. (1990). "Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions." Journal of retailing **66**(1): 33-55.
- Carrillat, F. A., F. Jaramillo and J. P. Mulki (2007). "The validity of the SERVQUAL and SERVPERF scales: A meta-analytic view of 17 years of research across five continents." International Journal of Service Industry Management **18**(5): 472-490 DOI: 10.1108/09564230710826250.
- Cho, I. J., Y. J. Kim and C. Kwak (2015). "Application of SERVQUAL and fuzzy quality function deployment to service improvement in service centres of electronics companies." To appear on Total Quality Management and Business Excellence DOI: 10.1080/14783363.2014.997111.

- Dahiyat, S. E., M. N. Akroush and B. N. Abu-Lail (2011). "An integrated model of perceived service quality and customer loyalty: An empirical examination of the mediation effects of customer satisfaction and customer trust." International Journal of Services and Operations Management **9**(4): 453-490 DOI: 10.1504/ijssom.2011.041242.
- Franceschini, F. (2001). Advanced Quality Function Deployment. Boca Raton (FL), CRC Press.
- Franceschini, F., M. Galetto, D. Maisano and L. Mastrogiacomo (2015). "Prioritisation of engineering characteristics in QFD in the case of customer requirements orderings." International Journal of Production Research **53**(13): 3975-3988 DOI: 10.1080/00207543.2014.980457.
- IfM and IBM (2007). Succeeding through service innovation: a discussion paper. Cambridge Service Science, Management and Engineering Symposium, Cambridge, UK, United Kingdom: University of Cambridge Institute for Manufacturing.
- Mashhadiabdol, M., S. M. Sajadi and K. Talebi (2014). "Analysis of the gap between customers' perceptions and employees' expectations of service quality based on fuzzy SERVQUAL logic (case study: Mofid children's hospital in Tehran, Iran)." International Journal of Services and Operations Management **17**(2): 119-141 DOI: 10.1504/ijssom.2014.058840.
- Ostrom, A. L., A. Parasuraman, D. E. Bowen, L. Patricio and C. A. Voss (2015). "Service Research Priorities in a Rapidly Changing Context." Journal of Service Research **18**(2): 127-159 DOI: 10.1177/1094670515576315.
- Parasuraman, A., L. L. Berry and V. A. Zeithaml (1991). "Refinement and reassessment of the SERVQUAL scale." Journal of retailing **67**(4): 420-450.
- Parasuraman, A., V. A. Zeithaml and L. L. Berry (1985). "A Conceptual Model of Service Quality and Its Implications for Future Research." Journal of Marketing **49**(4): 41-50.
- Rust, R. T. and R. L. Oliver (2000). "Should we delight the customer?" Journal of the Academy of Marketing Science **28**(1): 86-94.
- Shi, Y. Q. and J. J. Wang (2011). Evaluation of service quality of restaurant enterprise based on SERVQUAL. International Conference on Management and Service Science, MASS 2011.
- The World Bank. (2015). "Database." Retrieved March 2015, from <http://data.worldbank.org/>.
- Vasumathi, A. and R. Subashini (2015). "The influence of SERVQUAL dimensions on customer loyalty in banking sector, India - An empirical study." International Journal of Services and Operations Management **21**(3): 370-388 DOI: 10.1504/ijssom.2015.069656.
- Yin, S. Y., K. K. Huang, J. I. Shieh, Y. H. Liu and H. H. Wu (2015). "Telehealth services evaluation: a combination of SERVQUAL model and importance-performance analysis." To appear on Quality and Quantity DOI: 10.1007/s11135-015-0174-4.
- Zeithaml, V. A., L. L. Berry and A. Parasuraman (1993). "The nature and determinants of customer expectations of service." Journal of the Academy of Marketing Science **21**(1): 1-12 DOI: 10.1177/0092070393211001.
- Zeithaml, V. A., L. L. Berry and A. Parasuraman (1996). "The behavioral consequences of service quality." Journal of Marketing **60**(2): 31-46.
- Zeithaml, V. A. and M. J. Bitner (2003). Services Marketing: Integrating Customer Focus Across the Firm, McGraw-Hill/Irwin.
- Zeithaml, V. A., A. Parasuraman and L. L. Berry (1990). Delivering Quality Service: Balancing Customer Perceptions and Expectations, Simon and Schuster.
- Zhu, J. C., R. Ramanathan and U. Ramanathan (2011). "Measuring Service Quality using SERVQUAL and AHP: An application to a Chinese IT company and comparison." International Journal of Services and Operations Management **8**(4): 418-432 DOI: 10.1504/ijssom.2011.039662.