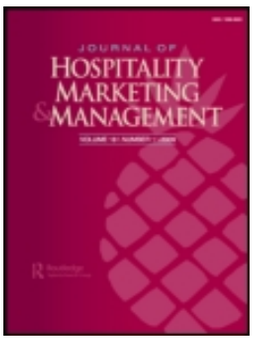

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Theory of Constraints Thinking-Process Tools Facilitate Goal Achievement for Hotel Management: A Case Study of Improving Customer Satisfaction

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This article aims to illustrate an implementation of theory of constraints (TOC) thinking process (TP) in order to analyze and improve operations at a hotel. The article contributes to the hospitality literature by demonstrating the effectiveness of the TOC TP within the hospitality industry. In order to understand current operations, data were collected through interviews, direct observations, and meeting with various focus groups. The research findings show that the TOC TPs can help hotel managers adapt appropriate strategies to successfully manage the constraints that were keeping the case study organization from improving its overall performance relative to its stated goal.

KEYWORDS theory of constraints, thinking process, hotel industry

INTRODUCTION

The theory of constraints (TOC) is a management philosophy introduced by Goldratt and Cox (1984) in their book titled *The Goal*. The underlying

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premise of the TOC is that, there is a very small number of constraints that prevent any organization from achieving its goal and there is always at least one constraint in a system at any given time (Reid, 2007). A constraint is anything that prevents an organization from achieving more of its goal, which in private sector organizations is usually to make more money both now and in the future (Goldratt, 1990). The TOC suggests that any organization can improve its overall performance and move toward its goal by improving the weakest link in the system.

According to Motwani, Klein, and Harowitz (1996) and Reid and Cormier (2003), the TOC thinking process (TP) tools can be applied to service companies as successfully as they are applied to manufacturing firms. In conjunction with the arguments of Motwani et al. (1996) and Reid and Cormier (2003), Gupta, Boyd, and Sussman (2004) indicated that service companies can improve their service quality and overall performance by adapting the throughput orientation of the TOC. Kim, Mabin, and Davies (2008) argued that future research should be directed towards case studies showing the implementation of the TOC philosophy in the service sector. Additionally, based on Schragenheim's (1999) definition of management philosophy as "guiding real world managers to make better decisions," Moss (2007) stated that the application of the TOC philosophy is not limited only to manufacturing companies. Finally, Moss (2007) and Mabin and Balderstone (2000) asserted that there was a limited number of studies investigating the implementation of the TOC in service companies. Albeit the implementation of TOC has been investigated in several service organizations, the only use of the TOC TP tools in the hospitality sector has been a study of a hypothetical hotel published by Schragenheim in 1999. Thus, the purpose of this article is to address this shortcoming by applying the TOC TP tools in analyzing a real hotel located within the city of Bodrum in Turkey.

Bodrum is one of the most important cities of Turkey and it is known as Turkey's "tourism city." Many tourists from different countries such as Germany, France, the United States, Spain, Austria, Holland, and Belgium visit the city of Bodrum each year and stay in the hotels of this city. The tourism sector makes considerable contributions to the economic development of Bodrum. Therefore, keeping customers satisfied is an important consideration for the future of the hotels located in this region. Thus, the results of the current research are expected to provide both the managers of the case study hotel and other hotel managers with an insight into how the TOC TP tools can be implemented in hotels.

The remainder of the article progresses as follows: the second section is devoted to the literature review. Following the literature review, the change process is explained in conjunction with the TOC TP tools. Then, the research design is presented in the fourth section. The fifth section describes the implementation of TOC TP in the case hotel. Finally, the sixth

section outlines the conclusions and managerial implications derived from the study.

LITERATURE REVIEW

The TOC uses three global or system-wide performance measures. These measures are: throughput, inventory/investment, and operating expenses (Goldratt & Cox, 1992). The TOC suggests that organizations focus on increasing overall organizational "throughput" while reducing inventory with little or no additional expenses. Throughput refers to the rate at which a system generates money through sales, while inventory/investment represents all the money the system spends on the things that it intends to sell. On the other hand, operating expenses include all the money the system spends to turn inventory into throughput (Goldratt, 1990; Motwani et al., 1996). For manufacturing firms, throughput is generated through the sale of tangible products. For service companies, throughput emerges from sale of services (Motwani et al., 1996). If a hotel is considered as a system, throughput is measured by sales minus true variable costs per specified time period that is generated from the rental of rooms to customers. From the perspective of a service firm, inventory refers to the unused units of the service (Siha, 1999). In this respect, for a hotel, inventory represents the potential unused rooms that can be rented, thereby generating throughput.

Numerous researchers have studied the implementation of TOC in the service sector. These studies are as follows: Shia (1999) theoretically discussed the applicability of TOC TP in various service industries. Motwani et al. (1996) described how the TOC philosophy has been successfully implemented in several health-care institutions. In another case study, Motwani and Vogelsang (1996) presented an implementation of the five-step focusing process of TOC in a U.S. engineering firm. Womack and Flowers (1999) implemented the continuous improvement process of the TOC in a government-owned health system called 366th Medical Group, which is a U.S. Air Force unit. Taylor and Sheffield (2002) showed how the TOC was implemented at the claims processing center in an insurance company. Reid and Cormier (2003) explained in a case study how the TOC TP tools were successfully implemented in a family-owned Mexican food restaurant. Gupta et al. (2004) implemented the TP tools of the TOC in an airline company and showed how those tools could be used for strategic planning in service companies. Lubitsh, Doyle, and Valentine (2005) demonstrated how the implementation of the TOC in three NHS trust departments reduced waiting lists in the system and increased throughput of patients. Through the use of a case study, Polito, Watson, and Vokurka (2006) showed how the TOC TP tools were used to improve the competitiveness of an airline company. Reid (2007) presented how the TOC five-step focusing process could

manage constraints in the service sector through a detailed example within a banking subsystem. Taylor and Thomas (2008) applied Goldratt's TP tools to an oil and gas engineering consulting firm. Finally, several researchers (see, for example, Shoemaker & Reid, 2005) demonstrated the use of the TOC TP tools in the public sector.

THE CHANGE PROCESS AND TP TOOLS OF THE TOC

As previously mentioned, the TOC TPs are logic tools designed to help understand and manage organizational constraints (Goldratt & Cox, 1992). Goldratt developed the TP tools and demonstrated their applications in his book titled *It's Not Luck* (Goldratt, 1994). The TP tools encompass a set of structured steps that are intended to enable managers to: (a) identify the existing managerial situations and determine the root cause of undesirable effects (UDEs), (b) develop and analyze appropriate strategies to successfully address UDEs and meet organizational goals, and (c) assess the impact of proposed strategies on various aspects of a system's performance (Reid & Cormier, 2003). Goldratt (1992) noted that these three steps are intended to locate the constraint (what to change), determine the solution (what to change to), and implement the solution (how to cause the change).

According to Goldratt (1992), the TP tools use cause-and-effect logic to provide decision makers with a structured method to identify and address business problems that inhibit organizational goal achievement. Whereas the implementation of the change process, within the context of TP, can be executed through three steps (Polito et al., 2006). The first step in TP is to construct a current reality tree (CRT). After the CRT has been developed and the root cause has been identified, the next step in TP is to construct an evaporating cloud (EC) diagram. The final step is to develop another causal diagram, which is called a future reality tree (FRT), along with a negative branch reservation (NBR).

Before starting to implement the three-stage change process, however, it should be clearly specified how the organization should be in the future. This can be achieved through the use of an intermediate objectives (IO) map. An IO map uses a necessity-based logic in order to show the cause-and-effect relationship among the organization's goal, the critical success factors necessary to reach this goal, and the necessary conditions that are needed to achieve the critical success factors (Dettmer, 2007). That is, an IO map establishes the question "why change?" and it yields a vision of future requirements that the organization must meet if it is to be successful. An IO map states that in order to reach the goal, the underlying critical success factors must be met, and in order to meet the critical success factors, the underlying necessary conditions must be realized. Once the IO map is created, the change process can be started. The logic diagrams that are used in order to execute the three-step change process are explained as follows:

CRT

Managers identify what to change in a system through the use of a TP tool that is called the CRT (Cox, Blackstone, & Schleier, 2003; Taylor & Sheffield, 2002). If the symptoms of the root cause are undesirable effects (UDEs), the root cause has to be identified and eliminated if the UDEs are to be changed into desirable effects (DEs). In creating a CRT, the most important UDEs, which are the problems or symptoms causing ineffectiveness relative to the achievement of the system goal and/or its critical success factors, are first identified (Goldratt, 1994). Once the UDEs are determined, the current state is identified and the UDEs are linked to the system's current policies and facts-of-life (FOLs) in an effect-cause-effect manner. That is, a CRT diagram starts with UDEs and its builder logically works downward in a cause-and-effect manner to logically identify a few root causes. Ultimately, the root cause(s) is/are found at the bottom of the CRT, which is the starting point in verbalizing the cause-and-effect relationships upward towards the UDEs. After a CRT diagram takes its shape, it is read from the bottom up using if-then logic statements.

Evaporating Cloud Diagram

Once the few root cause(s) or core problem(s) have been determined using a CRT, the next step is to identify what changes need to be made (what to change to) in order to manage the current constraint and/or eliminate the identified UDEs. For this purpose, an EC diagram is developed (Burton-Houle, 2000). An EC is prepared by first settling the opposite of the root cause, as an objective, on the left side of the EC diagram (see Figure 3). Then, two requirements that represent the necessary actions to achieve the objective are placed into entity boxes to the right side of the diagram.

These requirements are connected to the objective with arrows. Next, each requirement is accompanied by a prerequisite. In an EC, a conflict perpetuating the core problem represents these prerequisites. A solution is sought through challenging the assumptions underlying the conflict (Gupta et al., 2004). Thus, bringing the assumptions that underlie the conflict to the surface provides managers with an opportunity to identify possible strategies (or injections) to solve the problem. In that respect, the purpose of preparing an EC is to develop win-win solutions to the conflict and eliminate the core problem.

FRT and NBR

After selecting those changes that provide a win-win solution to the conflict in the EC, the next step is to logically determine whether or not the identified injections will result in desired outcomes in the future (Taylor & Sheffield, 2002). The TP tool used for this purpose is called the FRT. The

FRT is a sufficiency-based logic tree that incorporates the selected conflict solution(s) and traces their logical impact upward to determine if the UDEs from the CRT are changed to desirable effects (DEs). That is, if-then logic is used to convert the CRT to an FRT, which then shows how the proposed improvements will cause the UDEs to change to DEs (Taylor & Sheffield, 2002).

Whilst injections hopefully produce DEs, they may also cause some unintended consequences that may hamper the progress of change for the organization. This situation can be captured in a logic tree, NBR. It is used to portray the relationship between the intended changes and their potential negative effects (Dettmer, 1997). Once managers realize that proposed changes may result in an undesirable impact, they will need to formulate secondary injections that will logically allow the unexpected negative consequences to be overcome. Using sufficiency logic, an NBR is constructed in a similar fashion to the CRT and the FRT. That is, the NBR is a relatively small, sufficiency-based logic tree (Reid & Cormier, 2003). Furthermore, it can be transformed through secondary injections in the same way that the CRT is transformed to produce FRT. This transformation process is referred to as "trimming" the negative branch (Cox & Spencer, 1998).

THE RESEARCH DESIGN PROCESS AND THE CASE STUDY

The case study hotel is a boutique hotel operating in the City of Bodrum in Turkey. Due to confidentiality reasons, the name of the hotel is disguised in the current study. This hotel provides service at five-star hotel standards. The case hotel has a capacity of 72 rooms. The occupancy rate of the hotel varies between 20% and 30% during off-season and between 70% and 80% during peak season. The hotel has its own beach, pools, a steam bath, a meeting room, three bars, a laundry unit, one open-buffet restaurant, and two a la carte restaurants (one fish restaurant and one kebab house). These restaurants serve the customers staying in the hotel as well as other customers coming from outside. The hotel employs 50 personnel (one general manager, one assistant general manager, four front office clerks, 13 housekeepers, 18 restaurant staff, 10 bartenders, two accounting personnel, and one human resource manager).

One of the authors of this study has been working in the case hotel for several years as a management consultant. During the last couple of years, the hotel has been experiencing a loss of customers, lower than desired occupancy rates, and a decrease in profits. As a result of this, the hotel management requested help from the consultant in order to determine the reasons for this problem. Then, the consultant contacted the other author in order to work together on the issue.

As a first step, the authors conducted preliminary interviews with the personnel of the hotel. Then, they started to engage in direct observations in order to watch the activities of the personnel in different departments. The observations were intensified especially at the beginning of the peak season (between July and September). As a result of the observations and interviews, the authors realized that the front office staff failed to answer the telephone calls on a timely basis because too many calls were coming to the front office desk and some of the calls were unnecessarily taking too much time. The authors also found out that the front office staff was not able to provide on-time information to other units.

In addition to the hotel personnel, the authors also interviewed several customers coming to the hotel. These customers pointed out that, during the summer season, the waiting time for both check-in and check-out was too long. In addition, they noted that they waited too long on the phone when they called the front office desk in order to make reservations for the restaurant. Consequently, based on the results of the interviews and observations, the authors concluded that there is a bottleneck at the front office. In that respect, they mutually agreed that the implementation of the TOC TP tools might help them find a solution to the hotel's less-than-ideal performance.

Albeit the authors started preliminary interviews and observations during the month of May in 2009, the study in the case hotel actually started in July 2009 and ended in October 2009. This study adapted both convenience and purposive sampling techniques in order to select the research sample (Altinay & Paraskevas, 2008). A qualitative research strategy was used as the most appropriate method for a case study of this kind because case studies are often associated with qualitative research design (Yin, 1994). According to Ryan, Scapens, and Theobald (2007), case studies provide the researchers with an opportunity to understand the nature of systems in depth. Moreover, case studies could be used to explore the application of new procedures. In this study, a descriptive case study was first used in order to clearly demonstrate the current situation at the hotel. Then, an experimental case study method was executed in order to evaluate the results of implementing the TOC.

Semistructured interviews that lasted between 30 and 45 minutes were made with the general manager, receptionists, housekeepers, restaurant personnel, and customers. Semistructured interviews were chosen because they enable researchers to understand the issues in depth (Bryman & Bell, 2007). The interviewees were asked closed-ended as well as open-ended questions on issues relating to the main duties of the personnel in the hotel, the flow of information among different units, the length of time the personnel spent on the phone, the length of time the front office staff needed to answer the inquiries of customers, and customers' ideas about the quality of the service provided by the hotel. Direct observations were also used in order to

examine how the hotel staff exchange information with one another, as well as how long it takes for the front office staff to answer the calls and handle customer check-ins and check-outs.

After each visit to the relevant department, notes were written up in order to analyze the nature of the relationships and the tasks performed by the staff members were documented. All of the interviews were recorded on an audio-tape machine, and the data obtained through the interviews were filed. According to Lindlof and Taylor (2002), group discussions in the focus group provide researchers with an opportunity to get more insight into the data that may not be found using other methods. Thus, in order to gain a better understanding of the hotel personnel's perceptions about the main UDEs existing in the hotel, the researchers established a focus group. The focus group was composed of 10 people chosen from different departments, as well as the researchers. The researchers arranged several interactive meetings with the focus group, each lasting between 1.5 and 2 hours, which took place in an interactive manner.

IMPLEMENTATION OF THE CHANGE PROCESS IN THE CASE HOTEL

As explained in the previous sections, before starting to execute the change process, an IO map needs to be created. Therefore, an IO map was initially created before implementing the TOC TP tools in the case hotel. According to Goldratt and Cox (1992), the bottom line goal of organizations is to make more money (profit) now and in the future. Heskett, Jones, Loveman, Sasser, and Schlesinger (1994) added that profitability is primarily stimulated by customer loyalty and loyalty is a direct result of customer satisfaction. Likewise, Fornell, Anderson, and Lehman (1994); Kandampully and Suhartanto (2003); Imrie and Fyall (2000); and Wilkins, Merrilees, and Herington (2010) indicated that customer satisfaction is an important prerequisite to gain customer loyalty in the hotel industry. Parallel to the argument of Heskett et al. (1994), and Reichheld and Sasser (1990) noted that a 5% increase in customer loyalty could yield a profit increase of 25% to 85%. These researchers also showed that up to 60% of increased sales made to new customers could be attributed to recommendations made by loyal customers.

Whereas customer satisfaction through improved quality and value is a prerequisite for customer loyalty, the necessary prerequisites for improving the quality and value of customer services are the five factors of service quality that evolved from the extensive studies conducted during the latter half of the 1980s by the marketing researchers Parasuraman, Zeithaml, and Berry. Their work plus the research on service sector organizations performed by the Harvard Business School faculty of Heskett, Jones, Loveman, Sasser and Schlesinger in the mid-1990s is certainly applicable

to the hospitality industries as shown by Kang, Okamoto, and Donovan (2004).

The service quality (SERVQUAL) instrument was originally developed by Parasuraman, Zeithaml, and Berry (1985), and it encompasses 10 components of service quality. Then Parasuraman, Zeithaml, and Berry (1988) collapsed these factors into five dimensions: "reliability," which represents service provider's ability to provide accurate services; "responsiveness," which involves providing prompt and speedy service to customers in the right manner from the beginning; "empathy," which refers to providing individual care to customers; "assurance," which pertains to the knowledge of employees; and "tangibles," which are concerned with the appearance of physical factors such as equipment and facilities and employees. In recent years, numerous researchers have analyzed the service quality in the hotel industry (e.g., Saleh & Ryan, 1992; Tsang & Qu, 2000; Akbaba, 2006). While these studies confirm five-dimensional structure of service quality in the hospitality sector, they also reveal additional quality dimensions such as conviviality, employees, and convenience to deal with the hotels. Most of these factors have been incorporated into the left-hand side of the IO map as shown in Figure 1.

Goldratt (1994) has stated that the following three factors are necessary for every type of organization: (a) making money now as well as in the future, (b) providing a secure and satisfying environment for employees now as well as in the future, and (c) providing satisfaction to the market now as well as in the future. Dettmer (1997) further stated that whichever of the three you choose as a goal, the other two are necessary conditions (or critical success factors) for achieving it. Thus, both satisfying employees and satisfying customers must appear on the IO map as critical success factors.

According to Heskett et al. (1994) and Hartline and Jones (1996), the productivity of employees increases when they are more satisfied. The required conditions for having satisfied employees entails developing positive feelings among them towards their job, colleagues, and the company for which they work. This research-based information has been woven into the necessity logic comprising the right-hand side of the IO map as shown in Figure 1.

As pointed out previously, the case hotel was currently experiencing a loss of customers, lower than expected occupancy rates, and therefore a decrease in its profits. This means that it was unable to reach its goal (making more money now and in the future). The primary reason why the case hotel was unable to reach its goal was that customers of the hotel were not satisfied.

The following section explains how the TOC TP tools were executed in the case hotel in order to: (a) gain a deeper understanding of the current situation, (b) develop and analyze potential solutions to core problem,

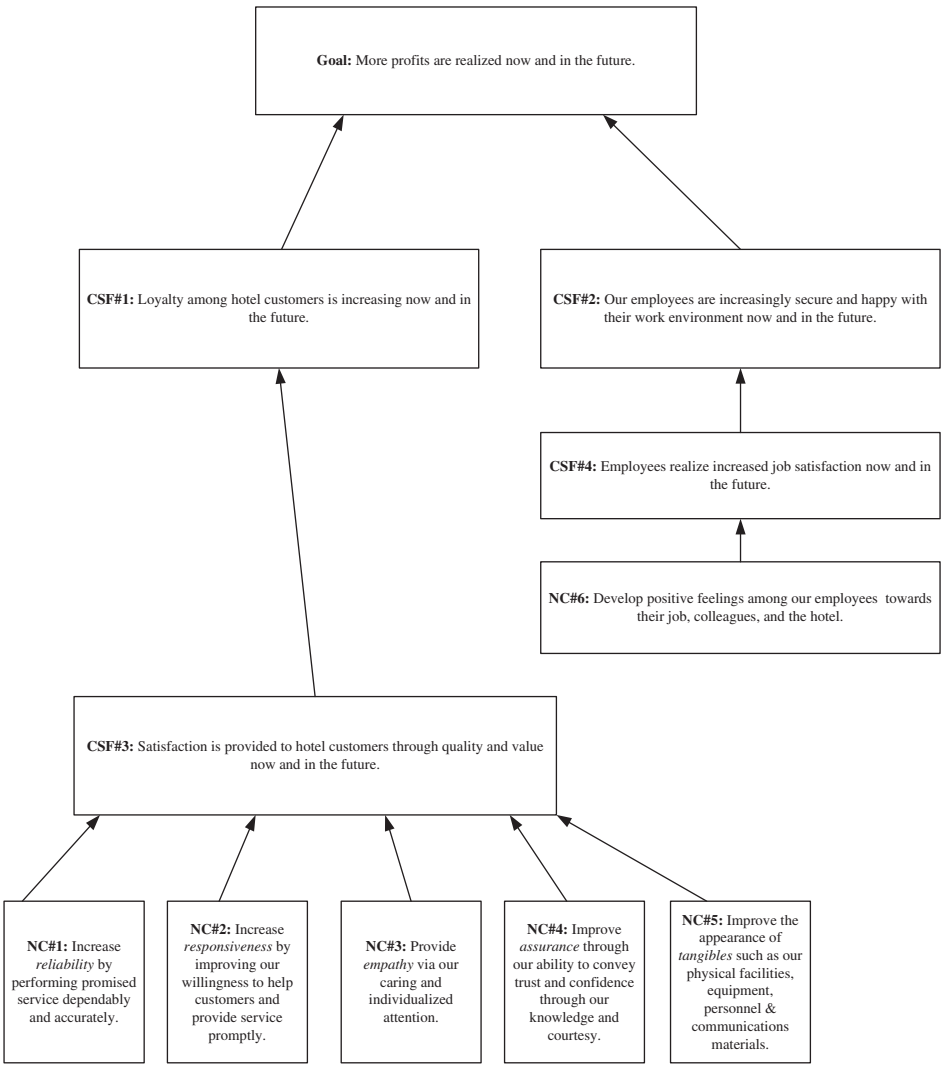

FIGURE 1 The intermediate objective map for case study hotel.

and (c) assess the impact of the proposed solutions on the performance of the hotel.

Analyzing the Current Situation and Identifying What to Change in the Case Hotel

As a first step in the implementation of the TP, interviews, observations, and focus group meetings were arranged in order to identify the most important UDEs in the case hotel. As shown in Figure 2, this data analysis yielded 14 UDEs that were identified as major undesirable effects that were

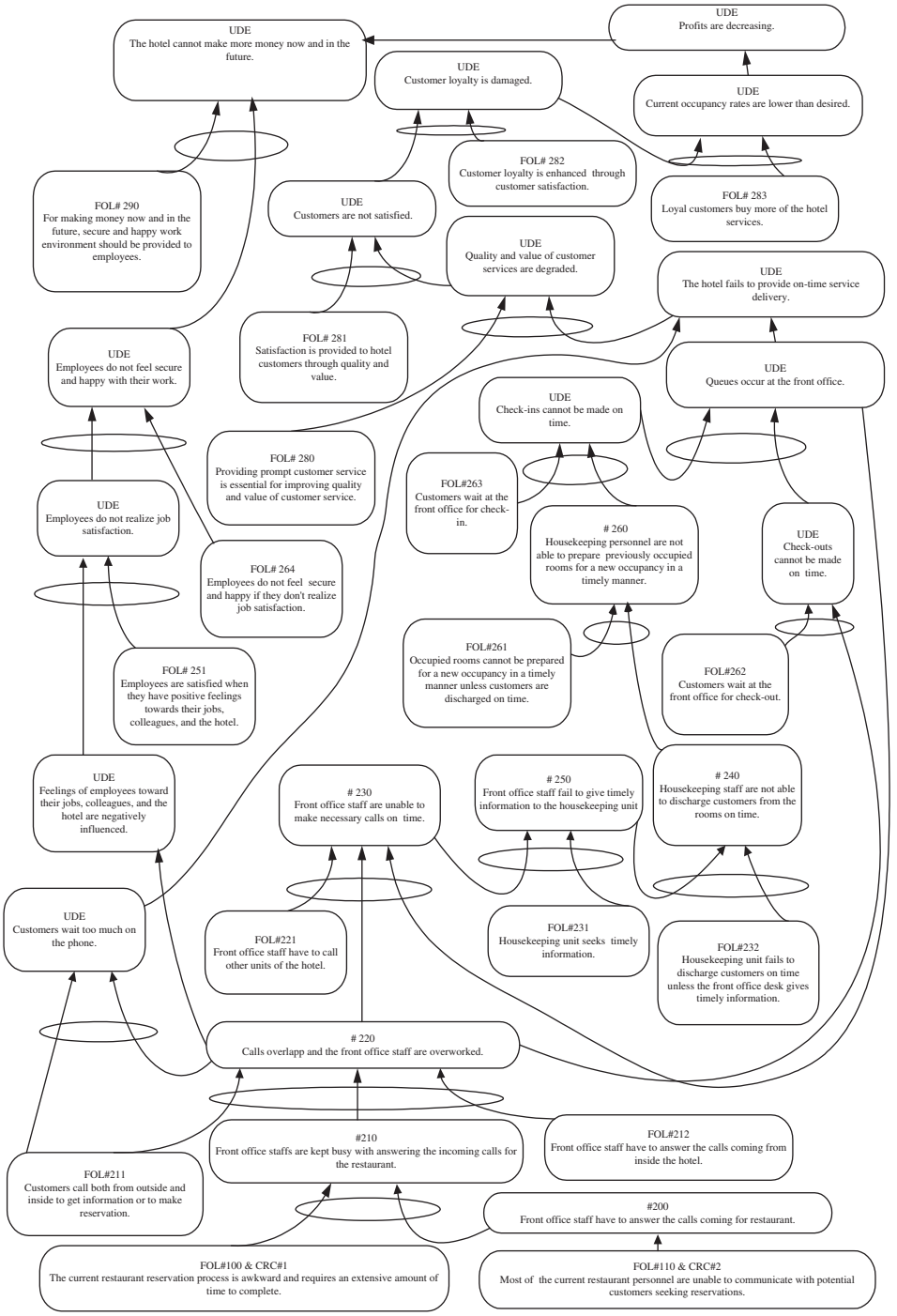

FIGURE 2 The current reality tree for case study hotel.

acknowledged as being present by the four focus groups at their meetings that lasted between 90 and 120 minutes during the months of August and September. In those focus group meetings, the effect-cause-effect relationships of the UDEs were discussed and analyzed. In order to better understand the interrelationships of the UDEs, a set of current FOLs were identified and logically linked with the UDEs as shown on Figure 2.

With regard to the construction of the CRT, the UDEs were positioned near the top of the CRT diagram and then coupled with appropriate FOLs using sufficiency logic into causal relationships. The causes associated with the subsequent UDEs were logically connected together with FOLs to form logically tight relationships with previously identified undesirable effects which, in turn, were detrimental to the hotel's goals. This was done repeatedly and documented in long chains of cause-effect relationships on the CRT diagram until the complete current reality at the case hotel was captured logically in the diagram. Finally, FOL 100 was identified as the critical root cause (or a major core problem), because this entity was causing the vast majority of the UDEs to exist in a cause-and-effect manner as one reads the logic from bottom to top on the CRT.

Since the majority customers staying in the hotel are foreigners, most are speaking in English, German, or French, whereas the personnel working in the restaurants at the hotel are not educated and cannot speak any foreign language. Thus, most of the current restaurant personnel are unable to communicate with potential customers seeking reservations (see Figure 2, FOL 110). This means that the front-office personnel have to answer the incoming calls for restaurant reservations. On the other hand, the current restaurant reservation process is awkward and requires an extensive amount of time to complete (see Figure 2, FOL 100). This is primarily because when customers call in order to make advance reservations for the a la carte and open-buffet restaurants, the front office staff has to then call the restaurant personnel and ask about the availability of seating. Then, the restaurant personnel must manually record this information and convey it to the front office staff. Once the front office personnel receive feedback from the restaurant staff, then they are able to give the final answer to the customer. Obviously, this is a very time-consuming process. As a consequence, as shown on Figure 2, FOLs 100 and 110 are linked and/or coupled with Entity 200 and are responsible for all UDEs shown on the CRT.

If the CRT diagram is read from the bottom up using if-then logic in a causal chain, it can be understood that the UDEs flow through cause-and-effect relationships and finally result in failures with regard to providing on-time service to customers. This, in turn, degrades the quality and the value of customer service. The resultant degraded service quality causes customer dissatisfaction. Next, customer dissatisfaction damages customer loyalty. Damaged customer loyalty, in turn, causes lower than expected occupancy rates. Lower-than-expected occupancy rates lead to decreased

profits. Finally, the resultant decreased profits prevent the hotel from making more money now and in the future.

On the other hand, when employees feel they are overworked (Entity 220 on Figure 2), their feelings about their jobs are negatively affected. This, in turn, causes employee dissatisfaction. When employees are not satisfied, they do not feel secure and happy with their work environment. This, one more time, hinders the hotel from making more money now and in the future.

In Figure 2, the single-barb arrow shows a causal relationship where the tail of the arrow represents the cause and the arrow's head represents the effect. It is noteworthy that, sometimes one entity is not sufficient to cause another. In these situations, an entity can be combined with an appropriately stated FOL via an "ellipse," which means both must be present to cause the effect. That is, an ellipse represents a "logical and" on a sufficiency-based CRT diagram (Taylor & Sheffield, 2002). The primary purpose of adding FOLs to the CRT is to tighten-up its if-then sufficiency logic so that it becomes irrefutable. Standard sufficiency based logic tree construction practice requires both UDEs and FOLs to be encased in round cornered rectangles (Dettmer, 2007).

Developing and Analyzing Potential Solutions to the Core Problem and Identifying Changes to be Made

After identifying the core problem, an EC diagram was developed in order to help create an effective method for eliminating the core problem or critical root cause. In the case hotel, it is time-consuming for the front office staff to deal with the incoming calls for restaurant reservations. However, the restaurant personnel are reluctant to answer the calls because of their limited language skills. In that respect, there is a conflict in delegating this task between the front office and the restaurant personnel.

As suggested by Burton-Houle (2000), as a first step in constructing the EC the opposite of the root cause was identified as an objective and it was posted to the left of the EC diagram. As shown in Figure 3, this objective was identified as freeing the front office staff, as much as possible, from dealing with the time-consuming process of answering the incoming calls for restaurant reservations. In the second step, the two requirements needed to attain the stated objective were determined as proposed by previous researchers (e.g., Burton-Houle, 2000; Gupta et al., 2004; Dettmer, 2007). Next, the prerequisites were identified for each of the requirements.

The EC is read from left to right as follows: in order to free the front office staff members from dealing with the time-consuming process of answering the incoming calls for the restaurant as much as possible, the need for them to answer these calls must be eliminated to the extent possible. At the same time, the amount of time that the front office staff

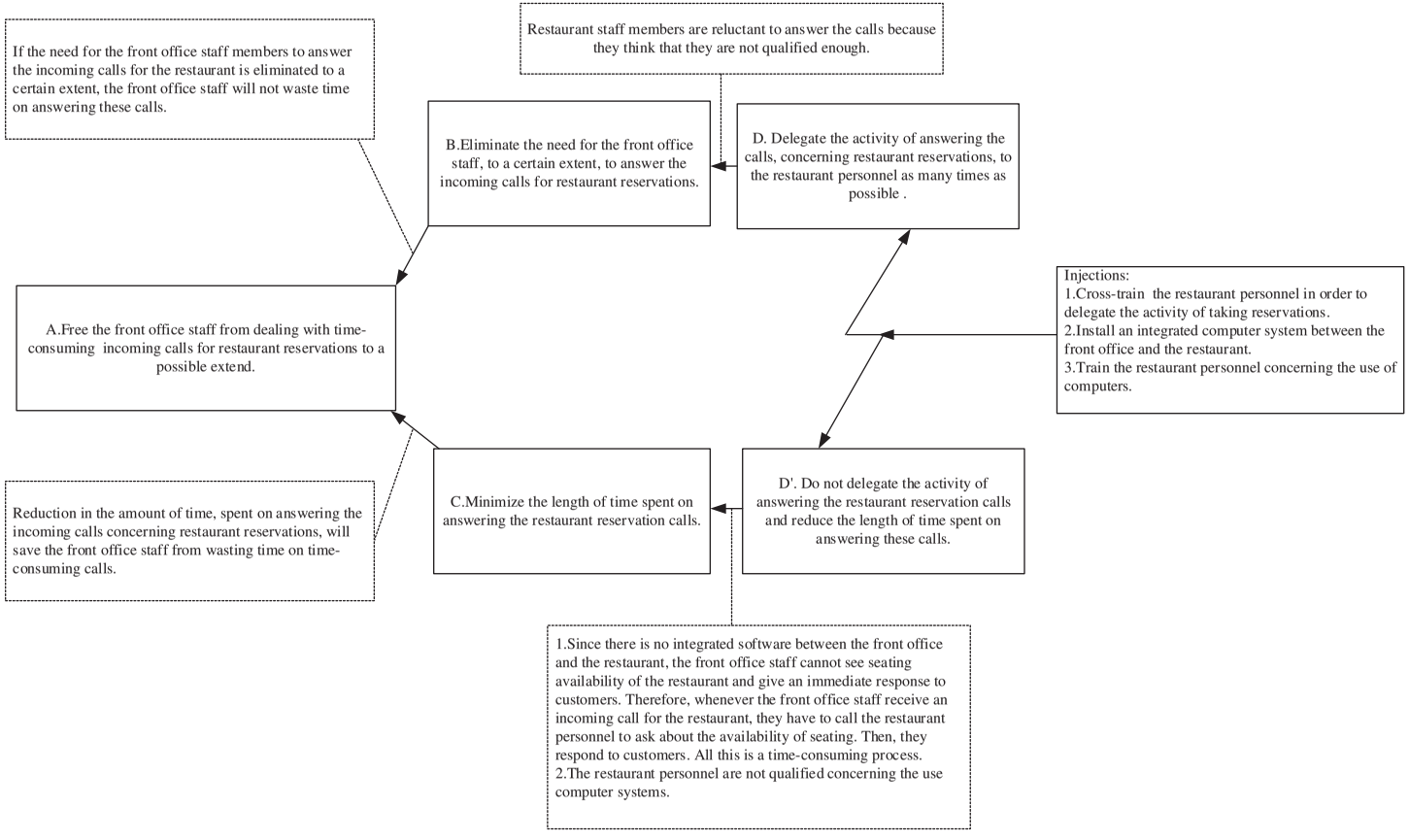

FIGURE 3 The evaporating cloud diagram for case study hotel.

members spend on answering these calls must be minimized. Then, in order to eliminate the need for the front office staff to answer the incoming calls for the restaurant to the extent possible, the activity of answering these calls should be delegated to the restaurant personnel (whenever possible). On the other hand, if this activity is not delegated and the front office staff members continue to answer the incoming calls for the restaurant, the amount of time needed to answer these calls must be reduced.

In the EC diagram, Entities B and C are two requirements necessary to accomplish Entity A. Entities D and D', on the other hand, are two opposing prerequisites which are necessary to achieve Entities B and C, respectively.

The hidden assumptions underlying the aforementioned conflict are presented in the attached boxes with dashed lines in Figure 3. These assumptions are:

- The restaurant staff members are not qualified concerning the front office skills.
- There is no integrated software between the front office and the restaurant.
- The restaurant personnel are not qualified to use computers.

The above hidden assumptions were triggering the conflict in the case hotel. Therefore, the following injections were inserted into the EC diagram to invalidate the assumptions and find win-win solutions to the core problem:

- Cross-train the restaurant personnel in order to delegate the activity of taking reservations: If the restaurant clerks are trained concerning foreign languages and front office skills, the activity of answering the calls can be delegated to them whenever the front office staff are busy.
- Install an integrated computer system between the front office and the restaurant: If an integrated computer system is installed between the restaurant and the front office, the front office personnel can immediately see the availability of seating within the restaurant and take the reservations in a very short period of time.
- Train the restaurant clerks concerning how to use computers: If a computer system is installed between the front office and the restaurant, the restaurant personnel should be trained so that they can use computers.

Assessing the Impact of Proposed Strategies on the Hotel's Performance and Identifying How to Make the Change

Once the EC was resolved and the necessary injections identified, the FRT diagram was developed in order to visualize the state of the system in the future and logically test if the implementation of the injections would change the UDEs to desired effects (DEs). To that end, the injections were

appropriately inserted at the bottom of a CRT structure and their impact on the linked entities was documented throughout the entire causal chain. If the UDEs are changed logically to DEs, then the FRT can be said to have demonstrated that the selected set of three injections would logically transform the UDEs to DEs. In short, the FRT diagram took its final shape as presented in Figure 4.

In Figure 4, The DEs and FOLs are represented by round-cornered rectangles while the injections are written in sharp-cornered ones (Dettmer, 1997). On the other hand, the arrows in the FRT diagram represent the causal relationship as presented in the CRT.

The FRT diagram should be read from bottom up using if-then statements in cause-and effect logic in order to understand how the proposed injections are expected to replace the UDEs with DEs. As can be seen in Figure 4, the injections lead to on-time service delivery, quick response to customers, satisfied employees, enhanced quality and value of customer service, improved customer satisfaction and loyalty, higher occupancy rates, more profits, and more money now and in the future. These are the conditions that are opposite the UDEs at the top of the CRT.

If the FRT diagram is read from the bottom up using if-then logic, it can be understood how the proposed injections lead to the DEs in a causal chain and how the resulting DEs flow through cause-and-effect relationships and finally result in the DE with regard to providing on-time service to customers. Providing on-time service delivery, in turn, improves the quality and the value of customer service. The improved service quality and value, in turn, lead to customer satisfaction. Next, customer satisfaction enhances customer loyalty. Enhanced customer loyalty, in turn, results in increased occupancy rates. Then, increased occupancy rates give rise to increased profits. Ultimately, the increased profits enable the hotel to make more money now and in the future.

On the other hand, when employees feel they are not overworked (Entity 220 on Figure 4), their feelings about their jobs are positively affected. This, in turn, leads to employee satisfaction. When employees are satisfied with their work, they feel secure and happy with their working environment. This, one more time, enables the hotel to make more money now and in the future.

Using Negative Branch Reservations to Overcome the Law of Unintended Consequences

The negative branch is a powerful feature associated with the FRT because it can prevent managerial stress and aggravation. Negative branches often occur as a growth of a FRT. They are likely to result from a combination of an injection and other conditions of reality that are not explicitly considered on your FRT (Dettmer, 2007). Figure 5 represents a NBR for the case hotel.

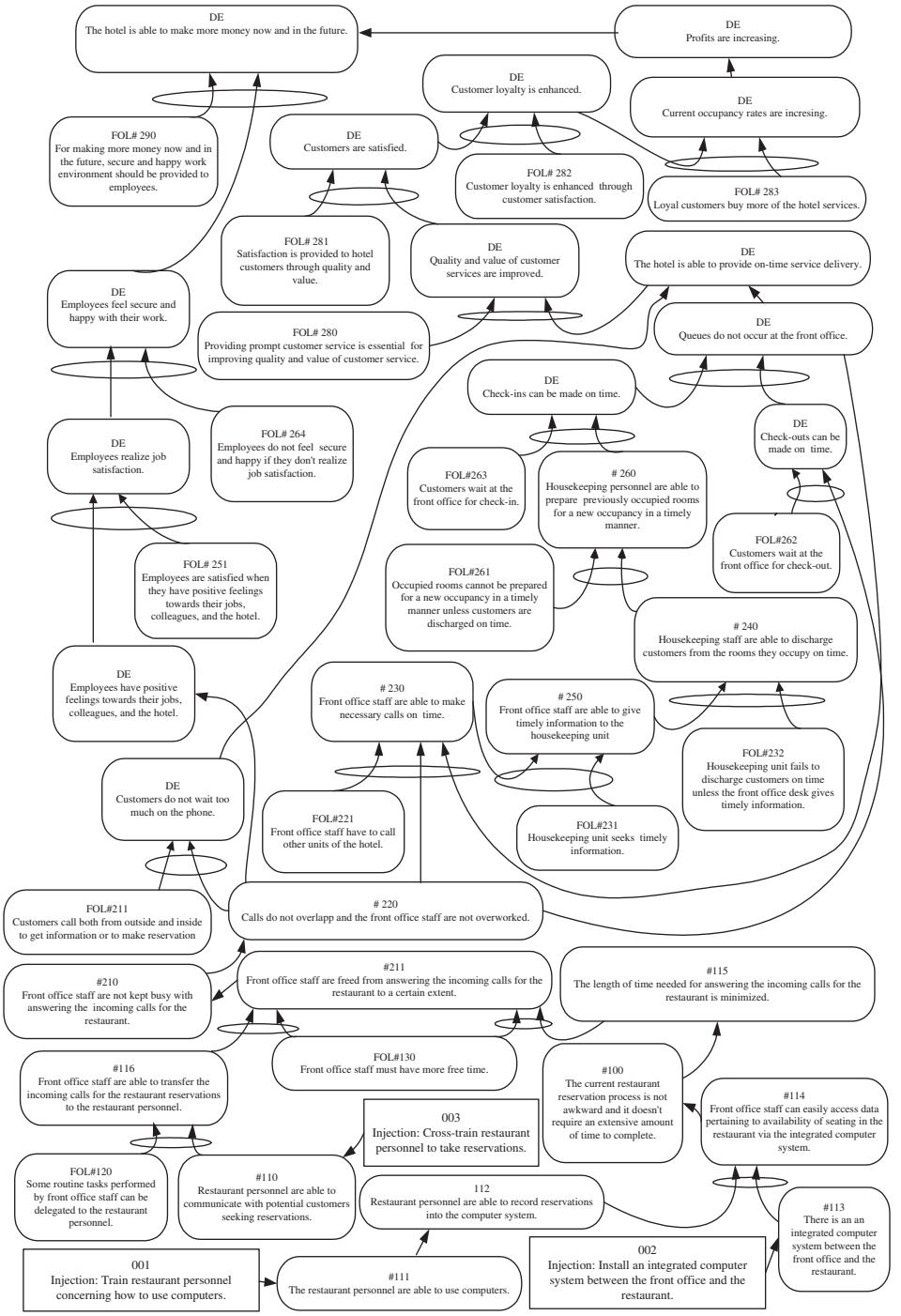

FIGURE 4 The future reality tree for case study hotel.

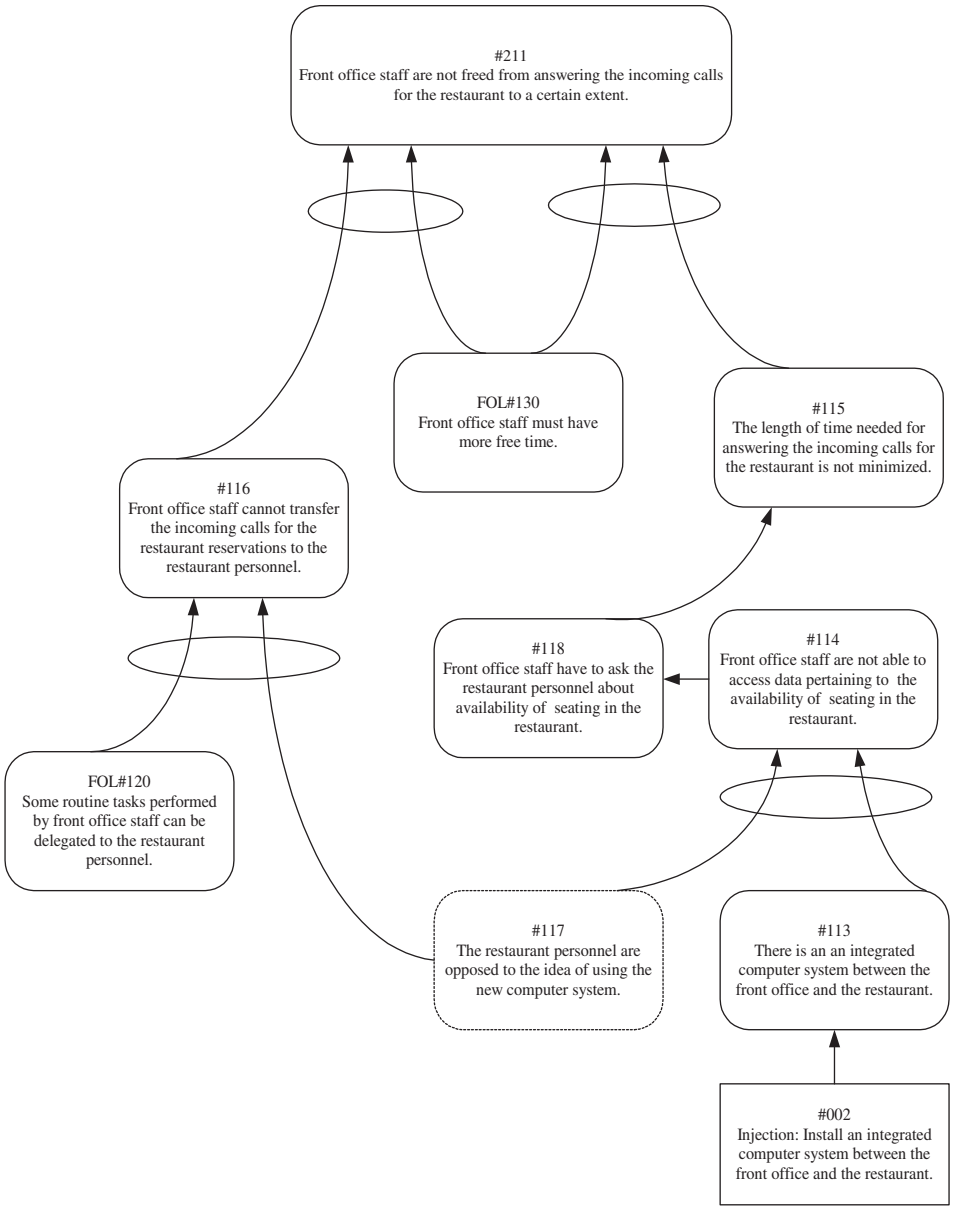

FIGURE 5 The negative branch reservation for case study hotel.

As shown in the Figure 5, the entity, which is represented by the rectangle with dashed lines, shows the potential negative impact associated with the injection "introducing an integrated computer system between the restaurant and the front office." This negative impact states that the personnel may be opposed to the idea of using the new system if integrated computer software is installed. This negative consequence may result from the fact

that the recommended changes may cause the restaurant personnel to be hesitant about what their future responsibilities may entail. As presented in Figure 5, logically this negative impact might finally result in a UDE, namely that the front office staff is not freed from answering the incoming calls for the restaurant to a certain extent. This UDE represents the opposite of the primary objective which was previously determined in the EC.

Through intensive interviews and focus group meetings, three secondary injections were proactively created in order to invalidate the unintended negative consequences and ultimately produce some additional positive effects. These secondary injections are also represented by rectangles with dashed lines in the "trimmed NBR" which is presented by Figure 6.

To prevent unintended negative consequences from the primary injections, three additional secondary injections are presented as follows:

- Managers of the case hotel should use teamwork, involve the personnel in the change process, and provide them with an opportunity to make suggestions for the proposed changes.
- Managers should communicate with the personnel and inform them about the progress of the change on a timely basis.
- Managers should effectively communicate with the personnel and explain that, the execution of the planned changes will be beneficial for them.

The aforementioned secondary injections are expected to eliminate hotel personnel's anxieties about the results of the change process, reduce their resistance to change, and allow them accept the change more quickly. This, in turn, could yield the other positive effects in a causal chain as presented in Figure 6. Ultimately, the front office staff would be able to free themselves from answering the incoming calls for the restaurant, at least to a certain extent.

By way of summarizing the methodology and the results attained from its use, a matrix was created to recap the major findings. Table 1 summarizes the results obtained from applying the following techniques: interviews, observations, focus group meetings, and the TOC TP logic tools. As it is demonstrated in Table 1, through the application of interviews and observations, bottlenecks were identified at the front office. On the other hand, the creation of CRT revealed that FOL 100 is the core problem. At first, the managers of the case study hotel seemed to be confused by the complicated shape of the CRT diagram. However, after we clearly explained the causal relationships embodied in the CRT diagram, they understood how the critical core problem causes the UDEs that were currently existing in the hotel. Based on the discussions carried out in the focus group meetings, three injections were developed in the EC in order to resolve the core problem.

Initially, the managers were cautious about the costs that might emerge as a result of implementing one of the three injections (with Entity 2 on

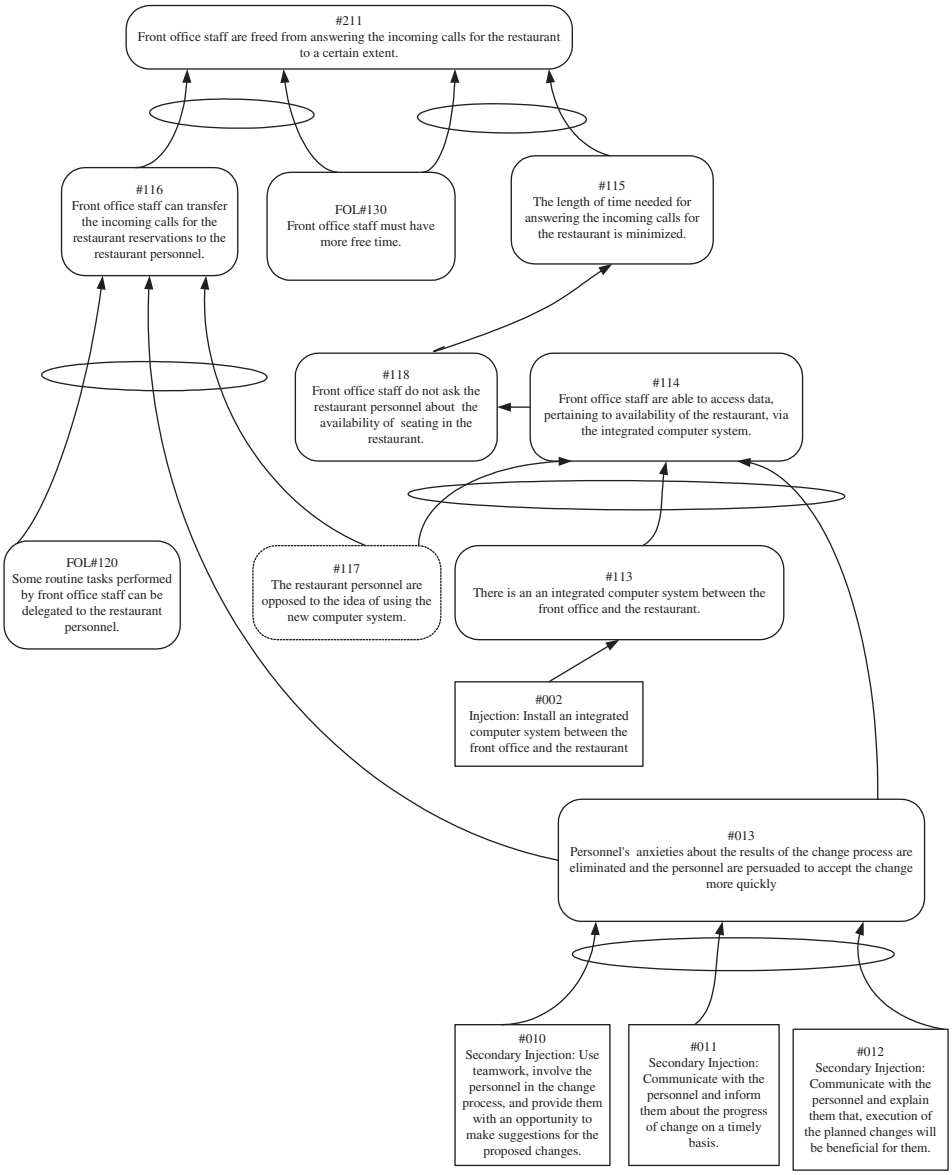

FIGURE 6 The trimmed negative branch reservation for case study hotel.

Figure 5): install an integrated computer system between the front office and the restaurant. However, after conducting a feasibility analysis, it was understood that installing an integrated computer system would be affordable by the hotel. The creation of FRT, on the other hand, revealed that the injections would convert all of the UDEs to 14 DEs when they are activated. With regard to the implementation of the FRT, however, the use of NBR revealed

TABLE 1 Results obtained from the use of interviews, observations, and theory of constraints thinking-process tools

Interviews, observations, and theory of constraints thinking-process tools	Results
Interviews and observations	The use of interviews and observations reveals that a bottleneck exists at the front office desk.
Current reality tree (CRT)	The use of CRT provides the hotel management with an insight into the following as the root cause of the core problem: The current restaurant reservation process is awkward and requires an extensive amount of time to complete.
Evaporating cloud (EC)	The use of EC enables the hotel management to focus on the following three injections in order to solve the core problem: 1. Cross-train the restaurant personnel in order to delegate the activity of taking reservations. 2. Install an integrated computer system between the front office and the restaurant. 3. Train the restaurant personnel concerning the use of computers.
Future reality tree (FRT)	The creation of FRT revealed how the implementation of the injections yields the following desired conditions: 1. Customers do not wait too much on the phone. 2. Check-outs can be made on a timely basis. 3. Check-ins can be made in a timely manner. 4. Queues do not occur at the front office. 5. The hotel provides on-time service delivery to its customers. 6. Employees have positive feelings towards their job, colleagues, and the hotel. 7. Employees realize job satisfaction. 8. Employees feel secure and happy with their work. 9. Quality and value of customer services are improved. 10. Customers satisfaction is improved. 11. Customer loyalty is enhanced. 12. Current occupancy rates are increasing. 13. Profits are increasing. 14. The hotel is able to make more money now and in the future.
Negative branch reservation (NBR)	The use of NBR revealed the following potential negative impact that could result when the injection—installing a computer system between the front office and the restaurant—is to be activated: The restaurant personnel may be opposed to the idea of using the new computer system.

(*Continued*)

TABLE 1 (Continued)

Interviews, observations, and theory of constraints thinking-process tools	Results
Trimmed negative branch reservation	The trimmed NBR demonstrates the three planned changes (secondary injections) which are considered to neutralize the anticipated negative impacts as follows: 1. Managers of the case hotel use teamwork, involve the personnel in the change process, and provide them with an opportunity to make suggestions for the proposed changes. 2. Managers communicate with the personnel and inform them about the progress of change on a timely basis. 3. Managers effectively communicate with the personnel and explain that, execution of the planned changes will be beneficial for them.

that there might be a potential undesirable impact associated with one of the injections (Entity 2). This potential impact implies that the restaurant personnel might be opposed to the idea of using the new computer system. Finally, Table 1 demonstrates three secondary injections which were developed on the trimmed NBR.

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

In this case study, bottlenecks that occur at the front office have been revealed as a result of direct observations and interviews. The attention of the hotel's managers should be directed towards improving the management of these bottlenecks that hamper the overall performance of the hotel. By identifying and focusing on the constraint rather than being overwhelmed by many issues that do not have any real impact on furthering goal achievement, the hotel management has an opportunity to leverage their improvement efforts.

In order to successfully manage the constraint, hotel managers need to initiate and execute several incremental/reactive change programs within the case hotel (see Nadler & Tushman, 1990). Based on an analysis of the results from the application of the TOC TP tools, the following recommendations are presented.

Firstly, it is suggested that the hotel management install an integrated computer system between the front office and the restaurant. It is thought that installing a computer system will reduce the length of time for the front office staff members to take reservations with only a slight increase in the costs. Additionally, exploiting the constraint in this manner is likely to

result in less customer waiting for service during their arrival check-ins and departure check-outs which will, in turn, reduce the queues at the front desk. Queue reductions at the front office will also enable the hotel staff to provide timely service to the hotel's customers. According to several researchers (see, for example, Tam, 2000; Nadiri & Hussain, 2005; Arasli, Smadi, & Katircioglu, 2005; Cranage & Mattila, 2006), providing on-time service delivery positively influences customer satisfaction. Thus, the case hotel is expected to increase its throughput and fill the unused rooms by: (a) selling more of its services to its current customers, (b) regaining lost customers, and (c) converting potential customers into real ones.

A second suggestion is for the hotel management to subordinate the restaurant staff to the constraint. Thus, the hotel's managers need to find a cost-effective method for training the restaurant staff. If the restaurant staff members are cross-trained to both take reservations and prepare and serve food, they can be subordinated to the constraint at any time. However, when implementing these changes, the hotel management may face several barriers. In particular, financial difficulties, time limitations, and commitment to current practices could be the potential barriers to change in the case hotel (see Okumus & Hemmington, 1998a; Carnall, 1995). In the focus group meetings, however, a cost-benefit analysis was conducted and it was agreed that the hotel could afford the installation of the new computer system. Moreover, in order to overcome the time limitation, the managers of the case hotel should implement the required changes in such a way so that the daily operations of the hotel are not disrupted. Additionally, the recommended changes may cause the restaurant personnel to hesitate about their future responsibilities because of their commitment to current practices. Nevertheless, Okumus and Hemmington (1998a) noted that communication, training, and involvement can be used as effective strategies in overcoming personnel's resistance to change in hotels. Thus, managers of the hotel need to use teamwork, involve the personnel in the change process, and provide them with an opportunity to make suggestions for the proposed changes. Additionally, the managers should communicate with the personnel and inform them about the progress of change on a timely basis. Also, they should explain to the restaurant and the front office staff that the execution of the planned changes will be beneficial for them as well as for the hotel. This kind of communication approach is likely to reduce the personnel's anxieties about the results of the change process and allow them to accept the change more readily.

It is apparent that the use of the TOC can help the managers of the case hotel to adapt, as appropriate, capacity management decisions to overcome disruptions at the front office desk. This will, in effect, eliminate the role ambiguity that the front office staff members are currently experience. If the constraint can be addressed in conjunction with the above recommendations, the hotel management will not need to elevate the constraint

by hiring additional front office personnel. This is due to the fact that by implementing the appropriate policy changes, the hidden capacity will be uncovered at the front office. In this case, the capacity of the front office staff will be increased without any need for extra personnel.

As demonstrated by the case study, the front office staff members are overworked. This may cause the front office staff to believe that they perform duties that should in fact be performed by other personnel. This is likely to raise the issue of injustice perceptions among the front office staff members. Nadiri and Tanova (2010) show that there are positive relationships among justice perceptions, job satisfaction, turnover intentions, and organizational citizenship behavior. Thus, the resultant injustice perceptions may: (a) cause a loss of organizational citizenship behavior among the front office staff members, (b) increase their intentions to leave their jobs, and (c) decrease job satisfaction. Moreover, according to Heskett et al. (1994), there is a positive relationship between job satisfaction and productivity. Therefore, decreased job satisfaction in the case hotel may result in a decrease in productivity.

Based on these considerations, it is obvious that with the help of the TOC TP tools, the managers of the hotel can eliminate both the bottleneck at the front office desk and the emergence of injustice perceptions amongst the front office staff members. This means that, the hotel management should use the TOC TP tools to develop positive justice perceptions among the hotel personnel. Moreover, the resultant positive justice perceptions are likely to enhance job satisfaction, organizational citizenship behavior, and job commitment. Finally, the positive justice perceptions will also reduce turnover intentions of the hotel personnel (see Lee, Murrmann, Murrmann, & Kim, 2010).

In addition to the suggestions we have made for the managers of the case hotel, several general recommendations for hotel managers have also been developed. According to Motwani and Vogelsang (1996) and Reid (2007), constraints in the service firms are usually policy related and result from poorly performing processes. These researchers add that the TOC philosophy can be used to bring policy-related constraints to the surface. Based on the arguments of these researchers, coupled with the results of our case study, our first suggestion to the hotel managers is that, they can utilize the TOC TP tools to identify the bottleneck, develop and analyze some potential solutions, and assess the impact of these solutions on various aspects of system performance in a continuous and systematic manner. In this case, managers also have to take into account the possible sources of resistance to the required changes they want to implement. Thus, they should also work on tailoring appropriate strategies in order to manage the change programs successfully (see Okumus & Hemmington, 1998b). The use of the TOC, in turn, could yield on-time service delivery, enhanced customer satisfaction and loyalty, and increased throughput. In this case, not only is the use of

TOC TP tools expected to provide hotel managers with an opportunity to formulate preventive strategies in order to eliminate the possibility for the service failures, but also an opportunity to take corrective actions in order to reduce the impact of the existing service failures.

Moreover, according to Boyd and Gupta (2004), there is a positive relationship between the throughput orientation of the TOC and the performance of an organization. In this sense, as a second suggestion, managers should focus on implementing the results of the TOC TP tools in order to increase throughput and enhance the overall performance of their hotels. Thirdly, managers of hotels must keep in mind that using the TOC will direct their attention towards overworked personnel. In this case, through the use of the TOC TP, they will be able to find an opportunity to shape appropriate capacity management decisions and to properly schedule the workforce in order to maximize the capacity of the constraint resource. Finally, the use of TP tools is expected to provide hotel managers with an insight into designing both preventive and corrective strategies. In this case, with the help of the TOC TP, hotel managers will be able to eliminate the existing as well as possible impacts of negative injustice perceptions and job dissatisfaction and reduce turnover intentions of the personnel.

The findings presented herein have been generated from a case study at a single hotel in Turkey. Therefore, the results of the study cannot be generalized to the hotel industry as a whole. Nevertheless, the outcomes of this case study can guide other hotel managers in applying and implementing results from the TOC TP tools at their hotels.

For further research, this study should be replicated at other hotels to identify whether or not the results are generalizable. Moreover, in this case study, the traditional approach to using the TOC TP tools has been used. Thus, other researchers should also consider demonstrating the relevance, feasibility and utility of implementing of other TP tools such as the generic conflict (evaporating) cloud, the prerequisite tree, and the transition tree (see, for example, the work of Shoemaker and Reid, 2005). Finally, the TOC management philosophy should be tested in depth in other organizations within the hospitality industry.

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