

THE PASSAGE FROM AIRLINE RESERVATION SYSTEMS TO GLOBAL DISTRIBUTION SYSTEMS

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ABSTRACT

Before global distribution systems such as Amadeus appeared, a revolutionary idea that triggered a chain reaction, changing the way people did business had emerged.

Throughout history a lot of ideas and inventions have come out, like the wheel, the steam engine, the printing press, the computer, the online environment etc. Such a revolutionary time was when airlines started to develop computerized systems to conduct their research.

Key words: global distribution systems, computerized reservation systems, Amadeus, reservation system

1. INTRODUCTION

Before the development of computerized systems, to make a reservation for a ticket with the airline companies was a complex process. Airlines published their schedules and ticket prices periodically, and these were then distributed to travel agents.

If a client wished to book a flight from, let us say, Paris to Berlin, the travel agent had to identify the airline that had any flights on the desired route and to examine each schedule to see if they have a flight that matches the customer's preferences. This search process through multiple flight timetables was simplified through the publication of the *Official Airline Guide (OAG)*, which gathered prices and dates from multiple airlines in one publication.

Once the travel agent identified a suitable flight, (s)he had to contact the airline reservation department to check if there were any available seats at convenient prices. Both the flight details and the advantageous price were then presented to the client for approval, after which the travel agent had to contact the reservation department once more to reconfirm the details and make the reservation.

Clearly these three traditional steps "search, call, reserve" were unsatisfactory for all the parties involved. The travel agent had to keep the schedule hours and (s)he had big

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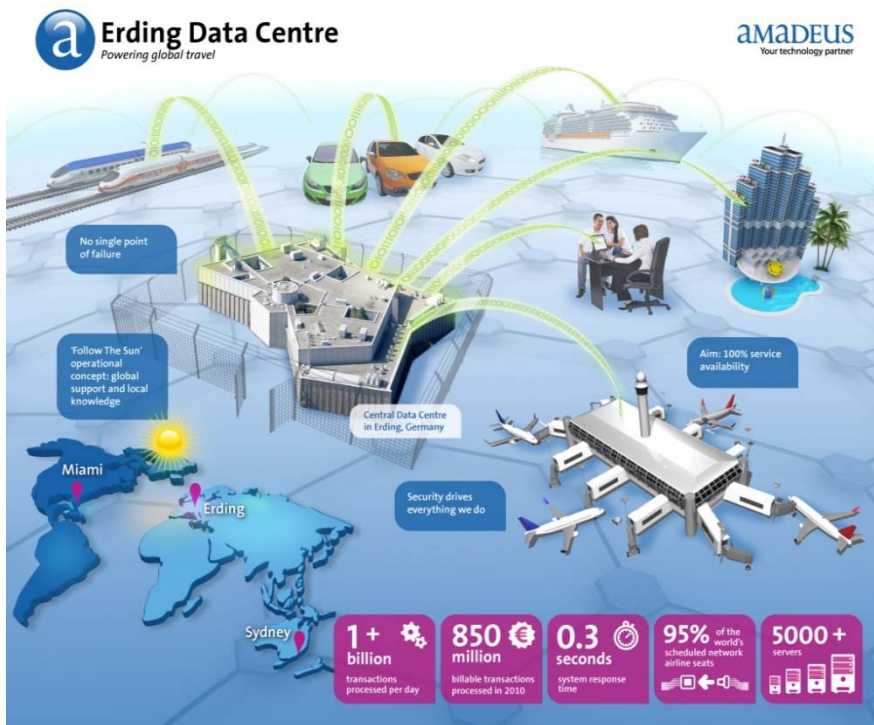
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telecommunication costs to call the airlines to check the availability and the cost of tickets and then to make the reservations.

Moreover, the amount of time that was necessary to deal with all the clients' requests, to find the relevant information and then to book the flight made the daily operations of travel agents very costly, from the point of view of labor costs. Research has shown that travel agents spent up to 80% of their time doing things that prepared them for making reservations, and only 20% actually making them. But, due to the commission that tourism providers and travel agents relied on, only the 20% generated revenue. The process was also unsatisfactory from the customer's point of view, as it entailed considerable delays.

The client was also required to trust the travel agent, that the latter found the cheapest, most convenient flight and available ticket cost, and, taking into account all the subsequent costs and revenue generating commissions, this might have not been the case.

Figure 1. Information flow in the global distribution system



Source: https://www.google.ro/search?q=amadeus&hl=ro&source=lnms&tbn=isch&sa=X&ei=p55RUZ3vFle7O4eUgeAI&sqi=2&ved=0CAcQ_AUoAQ&biw=1347&bih=635#imgrc=G8jb_MFkEWkROM%3A%3BSc aVB-7cxx70AM%3Bhttp%253A%252F%252Fnew.amadeusblog.com%252Fwp-content%252Fuploads%252F2011%252F10%252Famadeus_data_centre_infographic_brandedv2.jpg%3Bhttp%253A%252F%252Fwww.datacenterknowledge.com%252Farchives%252F2012%252F07%252F01%252Fc omputer-snafu-snarls-air-travel-australia%252F%3B1191%3B981

Finally, the distribution was in this way also far from ideal from the point of view of the airline company. They had to have a great number of employees that made reservations (which was therefore costly), handled all requests and processed the bookings from travel agents, at the same time paying a commission for each booking. It appears that they were paying the same work twice.

2. THE INTRODUCTION OF COMPUTERIZED RESERVATION SYSTEMS (CRS)

An airline company had yet another problem: depositing and conducting a great amount of data. It had to keep track of data on flight schedules, the cost of tickets, seat availability and passengers' reservations. Reservation programs were developed as internal control systems for airlines – to be used by their reservation staff to monitor seat availability more efficiently.

When (s)he is confronted with a request from a travel agent, the reservation agent from the airline company can find information and make reservations easily and rapidly using a computer connected to the main airline company database.

Airline managers understood that it would be more effective to allow agents to access the main system directly. That is why telecommunication costs have been decreasing since the 1970s; airlines were starting to place terminals in their agencies to allow agents to look for information and make reservations for them.

Clearly, this method has been more successful than the previous one. Being able to access the reservation database reduced the time agents needed to find information for clients and make reservations, and communication costs associated with the old manual system were also eliminated. At the same time, it gave instantaneous access to availability and to price information in real time, which helped increase service quality.

This arrangement was beneficial from the point of view of the airlines as well, as it was far less costly to distribute the equipment by facilitating direct access to the system, than to hire additional staff members to handle the increasing business volume.

Moreover, the airline company managers discovered that travel agents preferred to make the reservations with a company that provided reservation terminals. This helped the market expand, airline companies drew great revenue from the passengers, and the economic entrepreneurial spirit changed from a simple reduction in price to one of far greater strategic importance. Replacing terminals in agencies in a way that connected agents to flights ensured a better future for flight reservations.

3. THE EVOLUTION OF COMPUTERIZED RESERVATION SYSTEMS (CRS)

They are essentially computerized systems that assist tourism firms in the profitable manipulation of inventory and in the smooth distribution of tourism products. CRS are normally operated by tourism service providers, such as airline companies, hotels, or tour operators, and they are distributed nationally or internationally through computerized

systems or videotext. Normally, they use the mainframe and the extended networks to support more terminals guided from a distance in the travel agencies or other tourism firms.

Ever since the 1980s, CRS have greatly expanded, affecting all tourism firms. The constant update of information and the ability to provide specific information as well as to support the reservation, confirmation and purchase of a large variety of tourism products are the great advantages of CRS.

Initially, they appeared at the beginning of the 1960s, in view of supplying an effective tool to manage inventory. The rapid growth of demand and supply in tourism in the preceding decades had demonstrated that the industry could be kept under control by a single powerful computerized system.

Airline companies were the pioneers in the introduction of this technology because they replaced manual reservations with electronic databases. Soon, international hotel chains and tour operators realized its potential and followed the trend through the development of information centralization and of the reservation system. CRS is often used as an umbrella term to include a whole range of systems. CRS can provide important strategic tools for firms and destinations while autonomous business strategies are being formed.

The airline reservation systems tended to become a global distribution system (GDS) comprising a wide array of services and products that offered an infrastructural global distribution for the entire industry. CRS and GDS facilitated changes in the tourism industry before the arrival of the Internet. They got established as a comprehensive tool in travel marketing, and were often called travel supermarket. The need for a GDS appeared both from the part of demand and that of supply, and often from the perspective of the expansion witnessed in the tourism industry in the past few decades.

GDS facilitates the main needs of consumers for easy and transparent access to a wide range of information regarding manners of traveling, accommodation, luxury services, valid prices and the availability of these services.

Consumers also seek immediate confirmation of the reservation; they need information concerning sights, travel formalities and cheap standardized communication with potential providers. The satisfaction emerged as a result of tourism demand appears due to the accuracy and relevance of information as well as the rapidity with which demand is processed.

ICT is used to facilitate and coordinate the expansion of tourism companies and of global tourism. Tourism companies use CRS and GDS to coordinate and use their resources. CRS offer internal solutions for inventory control and for the management of demand. GDS can be characterized as the “circulatory system” of the tourism product on the international market.

CRS and GDS allow tourism service providers to control, promote and sell their products internationally, at the same time helping them to increase occupancy rate/the level of the occupancy factor, and to reduce seasonality.

Moreover, GDS often costs less in comparison with other means of distribution, allowing flexibility of price and capacity, to the purpose of adapting the tourism offer to the fluctuations of demand. CRS and GDS can reduce the costs of communication while offering managerial information on the types of demand and the competitors' position.

GDS also uses the tourism field by offering rapid and firm feedback to the clients' requests, making tourism products accessible in an efficient and financially advantageous way. The accuracy of the information provided by a system is a crucial factor for the success of a GDS.

Moreover, these global systems cut the costs of communication/reservation and facilitate the payment of commissions in the tourism industry. They have the tendency to generate clear financial benefits for the owners, in exchange for investment in the systems. These benefits include:

- Gross revenue from the commissions generated by the system and by the subscription;
- Participation and rental taxes;
- Assistance in the promotion of the mother company by preferential exposure, especially with aviation CRS and GDS (this has nevertheless been forbidden with GDS);
- Organizational and informational management benefit from the improvement of efficiency.

The GDS industry appears as an autonomous market and generates fierce competition between providers. GDS owners often try to increase the commissions required from participants in favor of their own products. GDS tries to maximize its market share through alliances and strategic mergers which essentially add value in this industry.

The efficiency of GDS allows owners to distribute and manage reservations globally, by the combination of clients' needs with the tourism offer. Consequently, great synergies are accomplished while the promoters of globalization stimulate the development of GDS and vice versa. Four main sets of conditions can be identified, namely: the cost, the market, the government and the promoters of competition which demonstrate why the globalization of the tourism industry is tightly connected with the ability to use computerized systems.

Finally, CRS and GDS should aim at increasing user satisfaction (for instance consumers, owners, travel agencies and shareholders), at providing high quality products and at allowing partners to maximize profitability.

Governmental institutions try to protect consumers and smaller companies in tourism. Consequently, they impose antidiscrimination and antitrust regulations, in order to make sure that real, exact, truthful information is presented while maintaining a satisfactory competitive level.

Tourism destinations are increasingly achieving their potential and create Destination Management Systems (DMS) to supply information on the tourism attractions and local products; hence, they stimulate sightseeing.

In the next table the survey shows online purchase of tourism products. Travel books, for instance, are made more for education and to help one have a more significant annual family income.

Figure 2: Online purchase of tourism products

Online purchase last year	Online purchase difficulty	Online purchase accessibility
Plane tickets	84%	71%
One night reservations	78%	63%
Car rentals	59%	36%
Museum, festival, sports events tickets	33%	21%
Amusement park tickets	18%	27%
Package tours	17%	9%
Cruises	8%	3%

Around 60 % of travel planners have chosen to travel in their spare time online this year. Website companies, online agencies and web portals are generally the most popular for reservations.

Normally, destination websites and search engines are not so popular for reservations as they are for planning them. Almost 50% of the difficulties encountered by online buyers are from the 18-34 years old generation. This is comparable with only 33% of the ease of reading a book online (age 35-54).

Since there are far more young people, the difficulty of online book readers is that they prefer having higher education to having children, their annual family income being a little more than average in comparison with online travel buyers.

Although statistics refer to American consumers, where a great number of consumers travel individually or with their family, European and Asian markets are expanding and gaining advantages to the detriment of online travel opportunities. The barrier raised by language and the small degree of ICT penetration can be two of the reasons why this process is being delayed.

Anyway, the forecast is that, gradually, consumers worldwide will be using the Internet more and more to plan their vacations and to get informed, at least as much as they already use it for business travels.

Therefore, it is obvious that online tourism organizations as well as destinations that are preparing to emerge on this electronic market will be capable of earning a few of the project benefits and to gain competitive edge.

4. OPERATING THE RESERVATION SYSTEM

As we have already explained, the first functions of the computerized airline reservation system were to allow agents to find relevant flight information and to make reservations directly from their terminals without having to call the airline reservation office. In order to facilitate this, the reservation system supplies some basic functions as part of the system.

In connection with these flight details (the departure and arrival hours, the class and the cost of tickets) and with reservation processing (including flight seats and the reservation of special services, like vegetarian food or medical assistance for clients with problems) most systems provide facilities regarding tickets, administrative problems and ticketing.

The cost of airline tickets differs according to class, travel dates, route, the interval of travel; in fact, all prices have to be calculated individually – a complex, time-consuming procedure.

Through automation, the efficiency of this process has increased tremendously, while valuable information is being supplied to the customer.

Having their own reservation system has brought significant advantages to airline companies. As we have seen, due to a lot of operational and cost advantages, CRS has become almost essential for travel agency distribution. A few airline companies have capitalized upon this aspect to gain competitive edge.

One example in this respect would be the use of a “*display bias*”, a pre-programmed type of display used as a marketing strategy. Research in the field has shown that most reservations (75-80%) are made with the first two airlines displayed in a flight list. By listing their own flights first, some systems were created in such a way as to prioritize them.

This situation was unfair to small airline companies that could not afford to have their own reservation system. This *display bias* proved to be anti-competitive and a law was passed to ensure that all displayed flights were listed correctly, in an unbiased way. Even without using this strategy, the owner of a reservation system has extra advantages.

For instance, despite appearances, travel agents often believe that flight details, availability and ticket costs of airline companies that own a reservation system are complete, precise and up-to-date in comparison with those from other airline companies that are only hosted by this system. This “*halo effect*” means that agents trust information coming from airline companies that are owners of reservation systems more, and because of this it is likely that they will make reservations for their flights.

The owners of a reservation system have also generated considerable revenue by cashing taxes from rival companies to host flight details within their computerized systems.

This revenue was supplemented by imposing high taxes to travel agencies to ensure a minimum number of reservations, asking from agents for a fixed annual tax for system usage, and through taxes for equipment rental. This revenue was so substantial (for instance, at the end of the 1980s, SABRE got profit of 30-40% of the total income of 400 million dollars) that *Robert Crandall* (the President of American Airlines at the moment) said that he would first sell the airline company and then the reservation system.

The system offers the airline company that owns it vast and valuable information on management, which allows the detection of tourism models, market segments and the efficiency of travel agents. This effectively gave them the opportunity to segment the market with complex cost restrictions and to use managerial principles that would help them maximize profit.

Airlines use this data to create new marketing programs, such as, for instance, the commission systems valid everywhere where travel agents are paid well in order to sell sets of products for a company rather than for the competition.

These extra commissions are granted in exchange for the increase of business volume on the market. For such a stimulating program to be successfully operational, operators need to monitor sales, which can be achieved only with the use of a sophisticated computerized system.

5. THE DISRUPTION OF AIRLINE FLIGHT SECTOR

In 1978, the disruption of the airline flight sector in the United States stimulated the emergence of the CRS. Essentially the disruption determined the emergence of new airline companies, which meant that more companies were competing for the same routes. This latter aspect presupposed smaller prices for consumers, more flights, more fares and passengers, so more confusion.

That is why the use of a computerized system became essential in the attempt to decipher the complex information available on the Internet. As a result, the first major systems developed on this market. In the United States, *American Airlines* launched SABRE, *United Airlines* launched Appolo, *Transworld Airlines* launched PARS, *Continental Airlines* launched System One and *Delta Airlines* launched DATAS II, all between 1970-1980.

The development was slower in Europe and did not last longer than the 1980s, under the menace of being replaced in the expansion of American systems, and of imminent crash, so American airline companies started developing their own systems. In contrast with the United States, these systems were developed and owned by national airline conglomerates. Both Galileo (of British Airways, Swiss Air, KLM and Alitalia, based on Appolo software) and Amadeus (of Air France, Iberia, Lufthansa and SAS, based on System One software) were conceived in 1987, but became operational as late as 1990 and, respectively, 1992.

Similarly, on the Asian market, *Quantas* and *JAL* were created by Fantasia based on SABRE software and *Singapore Airlines*, *Thai* and *Cathay Pacific* chose PARS as the software for their system Abacus.

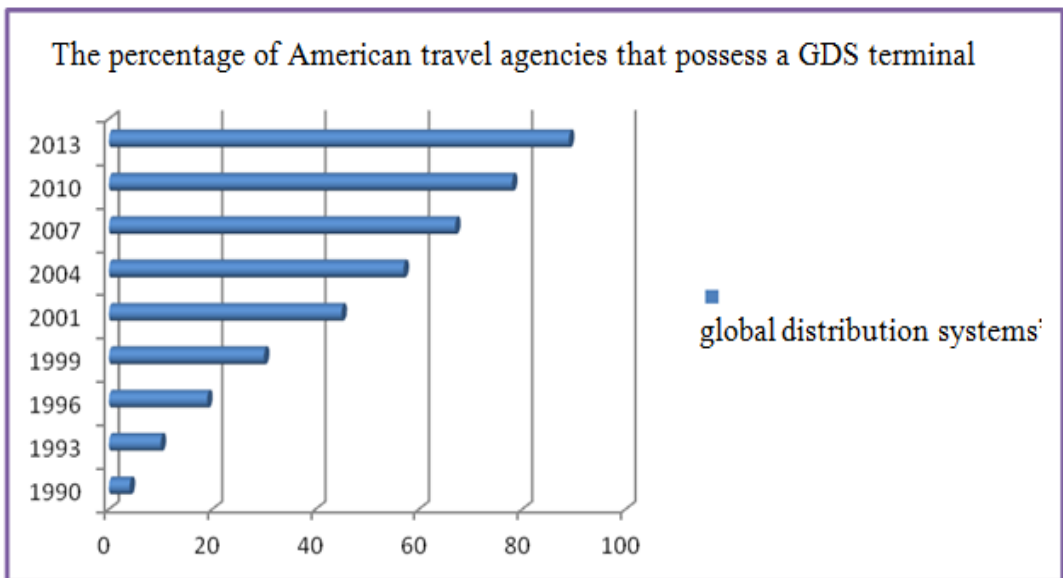
Next to the increase in number, airline systems extended in terms of functionality as well. The original systems were specifically for airlines – they only sold flights for their transporters. One of the early developments was content expansion to include inventory and information on the cost of tickets from other airlines in order to facilitate ticketing. It was a great opportunity, thus increasing the number of destinations to which the system could sell flights.

When the systems were specifically for airlines, travel agents could only sell tickets wherever the airline company owner had flights, and they had to either change the systems or pass to manual methods to process the connections between flights.

Being able to access a greater number of flights made the systems much more functional, changing their status from low-scale and regional to global. The scale of advantages to everyone involved was reflected by the rapidity with which travel agents adopted the systems.

These quickly became the dominant tools in the monitorization of flight reservations, as we can see in Figure 1:

Figure 3: The percentage of American travel agencies that possess a GDS terminal



As a consequence, the term “global distribution systems” started to be used to describe these new mega systems. Anyway, the disruption had yet another effect: the increase in the number of flights determined greater competition and thus the fare levels in the field decreased.

Travel agents that received a fixed commission (usually 10%) of what they sold to the clients were likely to have smaller earnings. In order to counter this effect, they targeted

cross sales of tourism products (such as hotel accommodation and car rentals) together with flight seats.

As their earnings increased comfortably through the electronic reservation process, agents were able to give other information as well, and make reservations for other tourism products from their terminals. At the same time, GDS companies had to increase their revenue. This range of products includes schedules for charter flights, hotels and other accommodation units, car rentals, bus tickets, holiday packages, yacht travels, excursions, theatre tickets and even champagne and flowers.

GDS supply the services of an electronic “*one stop*” shop for all the information regarding travel and the need for reservations, and hence they have become an important distribution channel for any product sold through travel agencies. To put it simply, if a provider wants to sell something through travel agents, (s)he needs to be listed on a GDS.

6. GDS HOTEL DISTRIBUTION

As we have mentioned before, one of the first complementary products distributed through GDS was hotel accommodation. Hotels imported the information concerning various types of rooms, their description and price according to the category in the free space from the airline company reservation system database, and when this information was available, thousands of agents worldwide made reservations at these hotels.

This status brought advantages for all participants. Hotels benefited from the distribution of their products to a wider audience, travel agents benefited from the fact that they could make reservations for more products through their computerized system, and the GDS benefited from an increase in the volume of reservations, which helped decrease the cost of operations.

Anyway, even though a hotel was listed on a GDS, which made it visible to thousands of agents from the entire world, this was far from an ideal sales tool. The structure of the data system raised problems.

As GDS were initially created to distribute plane tickets, the structure of the database was especially conceived to stock information about this product. A seat in the plane is relatively homogeneous – it is similar to any other on the same route. The hotel product, on the other hand, is diverse.

Even a relatively standardized hotel, with a simple structure, may have four types of rooms (apartments, double rooms, with two beds or singles), and three categories of comfortableness (low, medium and high), this giving a total of 12 combinations (low comfort apartments, medium comfort apartments etc.). Out of these 12 different combinations room/comfortableness, the GDS database structure could only display a few. This was a major limitation because the required price is usually a primordial factor in the choice that agents or their customers make.

For instance, a client may require an ordinary or promotional price, and if these are not listed in the system, the hotel will not be included in the initial search results and thus it will be eliminated from further consideration.

The rigid structure of the database also limits the hotel from a marketing perspective. For instance, after the initial search previously described, travel agents may look for a much more detailed description of every hotel that they are interested in. This second screen resembles in fact an advertisement and is very important, being a characteristic that differentiates each and every one of them from their competitor. Anyway, the database structure constrains their efforts, as it allows the import of a limited amount of information on the content and products per se. Moreover, due to space restrictions, simplified and abbreviated descriptions need to be used, up to the point where the differentiation of products and even clarity are being sacrificed.

For instance, the types of rooms were described with the help of codes made up of three letters, such as "A1K". "A" indicates the fact that this room is from the best category of the establishment, "1" shows that it has one bed, and "K" that the bed is king size. The best rooms from the hotel were described simply (regardless of the fact that they were from Ramada Inn or Ritz-Carlton) as A1Ks (rooms with king size beds).

Apart from the lack of flexibility, hotels came up against difficulties at the beginning and upon the introduction of information in the database. Importing data was a technical operation, each system using different protocols and syntaxes, so that every system had to be maintained separately.

In a lot of cases, the data that had to be imported already existed in a computerized form, but needed to be converted and reformatted so that it should match the structural limitations dictated by the GDS database. For this reason, the cost of using the GDS as a distribution channel increased. The update of information was also time-consuming, so a delay appeared between the moment when the hotel decided to change a date and the moment when this change appeared *live* in the system. This meant that hotels could not use the GDS as a channel for the distribution of special services and promotional packages unless these were integrated in the system a few months in advance.

These three problems – the limited number of types of rooms that could be displayed by the system, the inadequate description and the lack of special offers – meant that travel agents did not fully trust the information provided by the system.

In particular, the fact that not all the prices available on a property could be displayed determined the agents not to trust the computerized system, as often a different availability for the space and different prices were mentioned when they called the hotel main reservation office or the lodging unit directly.

That is why the agents did not use their systems to book hotel rooms at the same level with flight reservations, and thus a great part of the GDS hotel listing potential went to waste.

7. CONCLUSIONS

Although the main GDS subsequently adopted the massive changes in hotel sale modules, attempting to solve these problems, it was too late.

Struggling for a long time to classify the multiple types of comfortableness, prices, rooms and services in a GDS standardized database structure, those who made the development plans, for the hotel company and for the GDS itself, agreed that the development of the GDS hotel database is no longer practical.

An alternative strategy ensued. Rather than adding the hotel products in the GDS, they developed separate computerized systems, with a database structure that was closer to the nature of the products. These systems were subsequently connected to the GDS to distribute data to travel agents, the transaction fee being paid to the GDS operator for every processed reservation.

In this way, the previously-mentioned problems regarding the database could be avoided, while the hotel was allowed to find important market agents.

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