Integrated Tourism Service Supply Chain Management System Based on SOA

HU Xinyue
School of Management, Jinan University Guangzhou 510632, Guangdong, P.R. China

Abstract: To support the coordinated operation of the tourism service supply chain, integrated tourism service supply chain management system (ITSSCMS) is proposed. The tourism service supply chain system, connecting the source market, tourism intermediary organizations, long distance transport providers, destination service providers and other related service providers, is investigated. ITSSCMS architecture based on SOA (Service Oriented Architecture) is established to integrate the distributed and heterogeneous information systems (ISs) of different tourism service providers. The architecture is comprised of four layers: the supplier ISs layer, supplier management layer, service management layer, product management layer and tourism ecommerce layer. ITSSCMS integrates the business processes provided by different suppliers into tourist service package delivery processes, and streamlines the inter-organizational flows of information, service and money, in order to improve the competence of the individual organizations and the supply chain as a whole.

Keywords: Integration, Tourism, Service supply chain management (SSCM), Service-oriented architecture (SOA)

1 Introduction

A complete tourism service package is generally comprised of accommodation, food and beverage supply, transport both to and from the destination, ground transport within the destination, and events and activities such as excursions and social activities. These service components are provided by different companies, organizations and agents that constitute the tourism service supply chain.

Advances in ICT (Information and Communication Technology) and the globalization of the world market have brought structural changes to both manufacturing and service providing industries. In Europe and US, the ICTs have been applied in tourism since the early adoption of the CRS (Computer Reservation System) in airlines in 1950s and the transformation to GDS (Global Distribution System) in 1980s [1]. PMSs (Property Management Systems) and CRSs for hotels appeared shortly afterwards and have been progressively connected with GDSs. The ecommerce model along with Internet boom has brought even bigger impacts to the tourism industry. Many DMOs (Destination Management Organizations) have established DMSs (Destination Management Systems) [2] to promote the destinations and help the local small and medium-sized tourist enterprises (SMTEs) to compete with the multi-national corporations in the globalized world market. Dot-com entrepreneurs take advantage of the ecommerce and become online travel operators, such as the Expedia.com of US [3], threatening to put the traditional travel agencies out of business. However, little has been reported in the literature on how to connect these heterogeneous information systems in order to streamline the inter-organizational tourism service processes.

China lags behind the western countries in the ICT application in the tourism industry. Following a similar pattern as the Europe and US, the development of ICT application in China started in airlines and then extended to hotels, tour operators, attractions and DMOs, with the first two sectors taking the lead [4]. ICT applications of the Chinese tourist companies are still limited to internal management information systems, web hosting for information publication and promotion, and could not provide full scale B2B (Business to Business) or B2C (Business to Customer) eTourism services. Domestic online travel service providers such as Ctrip.com and eLong.com [5] could only provide simply products such as airline ticketing and hotel reservation, and could not offer compound, customizable tourism service packages through the integrated control and management of the service component suppliers.

The fast development of the ICTs has brought challenges together with opportunities to the tourism industry. Under the new ICT enabled ecommerce environment, the enhancement of the interconnectivity
and interoperability of the heterogeneous information systems and the integrated management of the tourism service supply chain have become major issues for the tourism industry domestic and worldwide. In this paper, after investigation of the tourism service supply chain system structure, the integrated tourism service supply chain management system (ITSSCMS) architecture based on SOA (Service Oriented Architecture) [6] is established to provide supports to the coordinated operation of the inter-organizational tourism service delivery processes.

2 Tourism Service Supply Chain System

Originated from the manufacturing industry, supply chain management (SCM) [7] aims at increasing the connectivity between different supply chain member firms, and streamlining the inter-organizational information, material and money flows of the supply chain, so that the supply chain could operate as a coordinated holistic system. By assembling of the business processes provided by different suppliers SCM can realize agility and flexibility, and enhance the competence of the individual firms and the supply chain as a whole.

![Figure 1 Tourism Service Supply Chain System](image)

Just as supply chains in the manufacturing, the tourism service supply chains have been operating in the tourism industry for a long time. Traditionally, the tour operators act as wholesalers of tourism services. They combine the service components supplied by the service suppliers into tourism packages and distribute the packages through travel agencies to the customers. Therefore, the tourism service supply chain is comprised of the source market, tourism intermediary organizations, the long distance transport providers, the destination service providers and other related service providers, as illustrated in figure 1.

- **Source market.** The tourist requirements have becoming increasingly individualized and diversified. The source market consists of customer segments of sightseeing, holiday and vacation, business traveling, events & exhibitions, DIY traveling, et al. How to integrate the complementary resources of the supply chain and satisfy the diversified customer demands is one of the major challenges of tourism service supply chain management.

- **Tourism intermediary organizations.** The tourism intermediary organizations include the tour operators (TOs), outbound travel agencies (OTAs) and inbound travel agencies (ITAs). The TOs act as the wholesalers of tourism services, negotiating with the service suppliers and assembling the service components into tourism packages. OTAs distribute and promote the tourism packages and help the tourists select and purchase the packages. And ITAs conduct the delivery process by coordinating the related service providers.

- **Long distance transport service providers.** These organizations provide transport service to and
from the destination including airlines, sea passages, trains, coaches, et al.

- Service provider of the destination. The main destination service providers include the accommodation suppliers (hotels, campsites, apartment et al), food and beverage service providers (restaurants, bars, caterers et al), local transport providers (public transport, car rental, fuel providers et al), cultural and social activity organizers (sports and recreation facilities, shops and factories, conferences, shows and festivals et al), environmental, cultural and heritage resource operators (public authorities, protected site management organizations, private concessionaries and owners et al). DMOs are usually accountable for the planning and marketing of the destinations.

- Other related service providers of passport and visa, traveling insurance, currency exchange and payment, communication, logistics, energy and other facilities are also indispensable parts of the tourism service supply chain for the customers to experience the integrated tourism services.

Traditionally, the tourism service supply chains have been operating in a spontaneous, loosely-coupled way. The tour operators and the service providers are only transactional counterparts, not cooperation partners. The firms of the tourism supply chain operate separately and never share information and resources to collectively seize market opportunities that could not be achieved by any individual firms. Just as the competition in the manufacturing has become the combat between supply chains supported by ICT, the unplanned and loosely-coupled operations of the traditional tourism service supply chains could not conform to the fierce competition in the global ecommerce environment.

ITSSCMS is proposed in this paper to support the integrated and coordinated operation of the tourism service supply chain. ITSSCMS integrates the business processes provided by different suppliers into a tourist service package delivery process, and supports the collaborative customization, planning, reconfiguration and operation of the service package delivery process through extensive sharing of the information and resource. Therefore, ITSSCMS must have the ability to integrate the distributed and heterogeneous information systems possessed by different tourism service providing firms.

3 Itsscms Based on SOA

SOA (Service-oriented Architecture) presents a new approach for building distributed systems by delivery of application functionalities as self-descriptive and discoverable services. SOA is also developing into a new business paradigm. Fully integrated traditional enterprises are being replaced by business service networks in which each participant provides the others with professional and individualized services. The Web Services framework intends to provide a standards-based realization of SOA on Web. Built upon a series of existing and emerging standards such as WSDL (Web Services Description Language), UDDI (Universal Description, Discovery and Integration), SOAP (Simple Object Access Protocol), and BPEL4WS (Business Process Execution Language for Web Services) et al, the Web Services technology constitutes a XML-based open mechanism for interoperability of heterogeneous systems at low cost.

As shown in Fig. 3, the ITSSCMS architecture based on SOA is composed of the supplier ISs (information systems) layer, supplier management layer, service management layer, product management layer and tourism ecommerce layer.

- In the supplier ISs layer, the business processes of the service suppliers’ heterogeneous (ISs), such as CRS, GDS, PMS, DMS, et al., are wrapped as basic services by means of service adaptors provided by the system.
- The supplier management layer supports strategic integration with the service suppliers by providing functions including SRM (Supplier Relationship Management), service purchasing management and service evaluation and incentive management.
- The Service management layer integrates functions of SOA service management (service registry, basic service operations, service composition management, service execution management, and service transaction management et al.) and tourism service process management (tourism service process modeling, integrated service process planning, service resource scheduling, service delivery monitoring et al.).
In the product management layer, the integrated tourism service products are designed by assembling the basic services provided by the suppliers to meet the customer needs; the integrated tourism service product repository is maintained through integrated product management functions; and the integrated tourism service products can also be customized with regard to the personalized customer requirements.

Tourism ecommerce layer provides full-scale e-commerce functions including tourism product publication and retrieval, selection and customization, reservation and payment, system security management et al. CRM (Customer Relationship Management) and customer service functionalities are also provided to facilitate better understanding of the customer needs and enhance relational customer connections in order to integrated more value-added services and actively create higher customer value.

ITSSCMS based on SOA can be implemented with Web Services technology. In the supplier ISs layer, the business processes of the service suppliers are encapsulated as basic services. These services are expressed as Web Services using WSDL and published in the service registry. When an integrated tourism service product is reserved online by a customer, the process model of product can be established with the modeling tools provided in the service management layer. During integrated planning, activities of the process are matched to proper services by selecting appropriate service providers from service candidates discovered based on UDDI. Using BPEL4WS, these selected services provided by different tourism firms are then assembled into a composite service to fulfill the delivery of the integrated tourism service product selected by the customer. And by binding the activities in the delivery process to corresponding basic services provided by the suppliers dynamically, the ITSSSC operates as a coordinated holistic system.

Built upon the Web Services technology, the proposed DITSSCMS architecture is open and scalable. Service participants communicate with each other through SOAP messages carrying XML data contents to realize low-cost interactions between heterogeneous information systems of the tourism firms.

4 Conclusion

With the fast development of ICT, the competition in the global tourism market has turned into the combat between different tourism service supply chains. However, the spontaneous, unplanned and loosely-coupled operations of the traditional tourism service supply chains could not conform to the increasing competitive global ecommerce environment. ITSSCMS is proposed in this paper to support the integrated and coordinated operation of the tourism service supply chain. Based on SOA, ITSSCMS integrates the real time operations information of the tourism firms, and assembles the services of the
individual firms into coordinated service processes. ITSSCMS supports full-scale e-commerce functions including online customization, reservation and delivery management of the integrated tourism service products. In a word, ITSSCMS enhances the connections between related tourism service providing organizations, streamlines the inter-organizational flows of information, service and capital, and integrates the individual organizations of the supply chain as a coordinated holistic system, in order to improve the competitiveness of the individual organizations and the supply chain as a whole.

Acknowledgements

The research is supported by the Humanity & Social Science Development Foundation of Jinan University.

References


The Author can be contacted from Email: yonglitang@gmail.com