THE ROLE OF INNOVATION IN DEVELOPING TECHNOLOGICAL CAPABILITY IN THE CUBAN TOURISM SECTOR

This study investigates the impact of innovation in the Cuban tourism sector on the development of technological capability. A theoretical framework that links managerial capabilities, organizational elements, absorptive capacity, and government role with the level of technological capability is presented and tested empirically based on the data on innovation projects from 62 tourism companies.

Introduction

Travel and tourism, encompassing transportation, accommodations, catering, recreation, and services for travelers, has long been one of the fastest growing industries in the world. According to the World Travel and Tourism Council, travel and tourism generated receipts of over 5 trillion US dollars and accounted for nearly 12% of world economic output in 1999 (WTTC, 1999). Over the last 30 years, the sector has been undergoing some significant changes. First of all, it has become much more international. Secondly, some of the developing countries have become very popular tourist destinations. As a result, tourism has become an extremely important sector of the economy for many countries. This trend is especially visible in the countries of the Caribbean region. Given the fact that the Caribbean has a higher proportion of total employment and gross domestic product (GDP) derived from tourism than any other region in the world, it is considered particularly dependent on the tourism industry (Harrison et al., 2003; Clancy, 2002). However, although many Caribbean governments and companies are in clear need of policy guidance on tourism strategy and development, there is a minimum of in-depth research on Caribbean tourism (Harrison et al., 2003).

The future of Caribbean tourism highly depends on the ability of the region to support sustainable tourism development, to provide services and products that can satisfy changing international travel market needs in effective ways, and to ensure high quality and safety in travel and accommodations. In order to be competitive and to meet these requirements, companies operating in the tourism sector need to become more innovative (Rodrigues and Burguet, 2003; Hjalager, 2002). As Rodriguez and Burguet (2003) state: “the tourism sector cannot achieve its strategic goals without implementation of technological innovation in its daily activities”.

1 The authors thankfully acknowledge funding received from Canadian International Development Agency for this project.

2 After Jayawardena (2002), the term “Caribbean” is used to identify 34 destinations that are members of the Caribbean Tourism Organization (CTO): Anguilla, Antigua, Barbuda, Aruba, Bahamas, Barbados, Belize, Bonaire, British Virgin Islands, Cayman Islands, Cuba, Curacao, Dominica, Dominican Republic, Grenada, Guadeloupe, Guyana, Haiti, Jamaica, Martinique, Mexico, Montserrat, Puerto Rico, St. Barts, St. Eustatius, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and The Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, U.S. Virgin Islands, and Venezuela.
The objective of this paper is to develop a framework explaining how companies can build their technological capabilities through the innovation activities; to investigate what factors influence relationship between innovation and technological capability; and to test this framework in the context of the Cuban tourism sector. The paper is divided into six sections. Sections two and three discuss the Caribbean area (in general) and Cuba (in particular) as destinations of international tourism. Section four presents a conceptual model of the relationship between innovation, technological capability and company performance. Six propositions are presented and justified. Section five describes the methodology of the study and discusses the statistical results based on survey data on innovation projects obtained from 62 Cuban tourism companies. The final section offers conclusions.

The Caribbean as a Destination of International Tourism

During the past half century tourism activity has become increasingly international as travelers cross borders for pleasure and business. The number of internationally tourist arrivals in the world grew from 25 million in 1950; to 459 million in 1990; and to over 700 million in 2002 (Jayawardena, 2002; WTO, 2003). The World Tourism Organization (WTO) expects this growth to continue and projects more than a billion international travelers by 2010 and 1.6 billion by 2020 (WTO, 2000). Most of the demand for and consumption of tourism takes place in the wealthier countries of the world. In 2002, France, Spain and the United States led the ranking of the world’s top tourism destinations by number of arrivals (WTO, 2003). However, during the past three decades international tourist arrivals to poor or “developing” countries have become much more significant (Clancy, 2002). China and Mexico have led the way, ranking fifth and eighth respectively among the world’s top destinations in 2002 (WTO, 2003). As a result, many developing countries have attempted to integrate tourism into a broad economic development strategy, especially if their other traditional economic sectors were showing stagnation. Consequently, many of these countries, such as the island nations in the Caribbean and South Pacific for example, have become extremely dependent on the tourism industry.

In 1999, the Caribbean region received 20.3 million tourist arrivals and US$17.7 billion in tourism receipts (CTO, 2001). Tourism earnings accounted for approximately 25% of the GDP in the region (CTO, 2001). However, the revenue from tourism was not evenly distributed among the 34 countries and destinations in the Caribbean. The most popular destinations were: Dominican Republic, Puerto Rico, Cancun, Cuba, and The Bahamas. Consequently, for many island states within the Caribbean region, tourism has emerged as a key growth factor (Crick, 2003). The promotion of tourism as a sector fostering growth resides in its perceived potential to accelerate growth in gross domestic product; to create employment; to increase foreign exchange earnings; and to attract foreign capital investment (Jayawardena and Ramajeesingh, 2003). However, at the same time the tourism industry in the Caribbean is faced with many challenges. One of the most difficult challenges is the need to deliver a high quality product that corresponds to the changing tastes, needs, and demands of the international traveler. Among other difficulties are: fostering sustainable tourism development, fighting crime, tourist harassment, lack of adequate education and training of tourism labour force, and significant seasonality of demand. The future of tourism in the Caribbean depends largely on the ability of the region to foster sustainable tourism development, on its efficiency in the planning of overall infrastructure and logistics for resort

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3 According to the World Tourism Organization, international tourists are residents of one country traveling abroad and spending at least one night but less than one year in another country (WTO, 2000).
4 According to the World Commission on Environment and Development, sustainable tourism development “implies meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987).
cities and villages chosen for hotel development projects; on its ability to ensure safety, and on
the acceptance of the industry by the local population (Jayawardena, 2002).

Tourism in Cuba: Stages of Development and Innovation Strategy

Cuba is the largest Caribbean island and one of the most popular tourist destinations in
the region. The development of tourism in Cuba can be divided into three stages (Jayawardena,
2003; Gutierrez and Gaspar, 2002): the pre-revolution era (1945-1958), the post-revolution era
(1959-1988), and the tourism revolution era (1989-2003). In the first period tourism development
was closely linked to American mafia operations, the United States was the main market, gam-
bling and prostitution were the island’s prime offerings, and the industry was focused mainly in
Havana. With the Fidel Castro revolution and the resulting U.S. economic blockade, tourism from
the United States was eliminated, economic development became centred on other programs con-
sidered important for the country, and tourism was mainly domestic. In the ’80s, international
tourism was reopened, but it was not until 1990 that visible development of the sector took place,
and led to increased growth in the number of visitors and income from tourism. The collapse
of the Soviet Union in 1990 and the continuing U.S. trade blockade have had serious repercussions
for the Cuban economy. Part of Cuba’s response to the elimination of Soviet subsidies has been
to develop tourism as a foreign exchange generator. In ten years of sustained development and as
a result of substantial investment, tourism has become the most rapidly growing sector of the Cu-
ban economy. Between 1990 and 1994, Cuba’s tourism grew more than 16% annually, compared
with 4.7% for the Caribbean as a whole (CTO, 2001). By the mid-1990s Cuba ranked sixth in the
top Caribbean destinations, and by 1999 it graduated to fourth position, surpassing the Bahamas
and Jamaica (CTO, 2001). The number of arrivals grew from 340,000 travelers in the 1990 to
1668,162 in the 2002 (Jayawardena, 2002; CTO, 2001). As a result, tourism has played an ex-
tremely important role in the Cuban economy and since the 1990s has been considered an impor-
tant part of its development strategy (De Holan and Phillips, 1997). The main tourist centres are
Havana and Varadero. Canada, Germany, Italy, Spain, France, United Kingdom and Mexico are
the seven main tourist sources and in 1999 they represented 65.75% of the total number of visi-
tors arriving in Cuba (Jayawardena, 2002). The importance of tourism can be measured in terms
of foreign exchange income (by 1995 it ranked as Cuba’s second, after sugar industry, highest
gross foreign exchange earner with value of $1 billion), or in terms of employment (in 1990 the
tourism industry provided direct employment for around 52,000 workers, while in 2002 for over
100,000 workers) (Clancy, 2002).

Cuba is actively working on the development of its tourism industry in several ways. Be-
tween 1990 and 2001 more than US$4 billion were invested in the tourism sector. Most of the
investments were directed towards increasing hotel capacities and developing infrastructure. The
hotel capacities went from 12,900 rooms in 1990 to some 37,225 at the closing of 2002, which
are grouped in 240 hotels. Secondly, in 1994, the Ministry of Tourism (MINTUR) was created to
fulfill the guiding functions of political direction, regulation and control of the sector. Ministry’s
strategic objectives are the following: designing and developing more efficient marketing of the
tourism products, increasing and diversifying tourism products and making them more competi-
tive, remodelling and increasing room capacity, increasing the tourism system’s economic effi-
ciency, bringing computer and communications systems to the most advanced levels, and incor-
porating more foreign capital into the sector. Innovation in tourism is an important part of the
country’s general policy to foster innovation in all its industries (Klinghoffer, 1998). In order to
support and enhance the organization and management of scientific and innovative activity in
Cuba and to promote development of innovative enterprises, Cuba’s Ministry of Science, Tech-
nology and Environment has developed the System of Science and Technological Innovation, the
National Policy of Science and Technological Innovation, and the National Strategy of Science and Technological Innovation. In order to guarantee the training and upgrading of the sector’s personnel, the National System for Professional Tourism Training (FORMATUR) has been created, composed of 19 schools (Wood & Jayawardena, 2003).

Conceptual Framework of the Research

The model developed for this study postulates that innovation contributes to improved technological capability which leads to improved economic performance and is presented in Figure 1. The extent to which technological capability is enhanced through innovation activity of a company depends upon three broad types of factors: factors related to the company itself, to the innovation being introduced, and to the company’s external environment. The model presented in this study addressed factors in each of these categories. The company-specific factors include: the company’s managerial capabilities (leadership and employee support, knowledge and technical expertise, group management skills, and project management skills), organizational elements (learning culture, organizational structure, systems and procedures in place), and the company’s absorptive capacity. The innovation-specific factor considered in the study is the technological complexity of the innovation. As for the third group of factor, environmental factors, the government role is included in the model.

Innovation

The most widely used definition of innovation is that it is the adoption of an idea or behaviour that is new to the organization (Hage, 1999). The innovation can be a new product, a new service or a new technology. Consequently innovation is related to change, which can be either radical or incremental (Harkema, 2003). There are different classifications of innovations. For the needs of the tourism sector, Hjalager (1997, 2002) distinguished between the following categories of innovations: product innovations, process innovations, management innovations, and logistics innovations. Hjalager (2002) also stated that the tourism industry’s structure, i.e. a large number of small size companies, and its dynamics and human resource capabilities make it considerably different from other sectors of the economy, and pointed out the need for more research on the innovation in tourism. One of the objectives of this study is to further investigate what types of innovation are most popular in the Cuban tourism sector and how these innovations may enhance the technological capability of a tourism company.

Technological Capability

Technological capability can be defined as “the ability to make effective use of technological knowledge” (Westphal, et al., 1985, p.171). An analysis by Kumar et al. (1999, p.82) concluded that “technological capability must enable an enterprise to undertake a range of productive tasks, extending from pre-investment analysis to product and process engineering, manufacturing and the introduction of new technologies as they appear”. Technology capability can be defined as the firm’s ability to: identify its technological needs and feasible investment projects (investment capability); operate, maintain, modify and improve the selected technology (operational capability); and promote technical internal and external learning (dynamic learning capability). According to Leonard-Barton (1995) and Kumar et al. (1999), technological capability is an ongoing process of learning. Thus, the technological mastery is achieved when the firm has build up technological capabilities.
Managerial Capabilities

The changing nature of organizations and the environment in which they operate has brought with it an increased need for effective managerial work (Bezant & Rush, 1995; Kanter, 1989; Harris and Kumar, 2000; Rosenbloom, 2000). Managers are facing new expectations and challenges (Marino, 1996; Maletz and Katzenbach, 1999; Doyle, 2000; Chapman, 2001) and are constantly reminded of their pivotal role and the “criticality” of the strategic influence they exert in respect to the evolution of capabilities and thus the contribution to organizational performance (Floyd and Wooldridge, 1997; McClements and Smallman, 1998; Doyle, 2000; Tripsas and Gavetti, 2000). Successful technological innovation and improvement of technological capability depend on critical managerial capabilities (Wallender III, 1979; Leonard-Barton, 1995; Kuemmerle, 1997). Jayawardena (2000) and Jayawardena and Haywood (2003) presented the managerial attributes that are prerequisites for success in international hotel management. Based on the literature, four groups of managerial capabilities were identified and are considered in the model as important factors affecting the relationship between innovation and technological capability: leadership and employee support; knowledge and technical expertise; group management skills; and project management skills. The following hypothesis is advanced:

Hypothesis H1: Higher levels of managerial capabilities (leadership and employee support; knowledge and technical expertise; group management skills; and project management skills) increase the degree of a firm’s ability to develop technological capability through innovation.

Organizational Elements

Organizational elements are consistently identified in the literature as important in the success of any company. Most successful companies periodically adapt their organizations to fit the evolving needs dictated by external as well as internal factors. In this study, we analyze three organizational elements of a firm that may facilitate or inhibit the firm’s development of technological capability through innovation: organizational structure, learning culture and systems and procedures.

Learning culture. The accumulation of knowledge, skills and technological capabilities depends on systematic investment in continuous organizational learning (Lei, 1997). Organizational learning is more than the learning of individuals within the organization. It includes learning among individuals and groups, and learning that becomes embedded in the organization in terms of systems, structures, strategy, and procedures. Learning mechanisms include in-house training programs, learning-by-doing, strong networking with local suppliers, clients, other firms, industry networks, research institutes, government, universities, financial institutions, and local or foreign consultants. As noted by Cusumano and Elenkov (1994) learning processes within the firm facilitate the acquisitions of technology capability by the firm. This comes from establishing appropriate organizational routines, accumulating specialized industrial skills, and acquiring the ability to learn selectively. Thus, the firm must have the ability to promote learning culture within the organization to augment its technological capability (Wallender III, 1979; Lynn, 1985; Fiol and Lyles, 1985; Westphal et al., 1985; Wei, 1995; Bierly III and Chakrabarti, 1996; Whiston, 1996; Levinson and Asahi, 1997; Kumar et al., 1999). Therefore, it is hypothesized that:

Hypothesis H2: A higher level of a firm’s learning culture is positively related to the firm’s technological capability.

Organizational structure. Structure is the way firms organize their activities, the number of hierarchical levels, and the complexity of communication channels and flows. It is how the work among functions, departments, and projects is divided. Shenhar and Adler (1996) pointed out that the structure of the organization has a great impact on its ability to meet new challenges.
in technological development and project management. A firm’s current knowledge base cannot be separated from how it is currently organized (Kogut and Zander, 1992). The existing organizational structure influences how a firm processes knowledge. All firms depend on smooth information flow between individuals, groups, departments, and functions. Thus, in order to improve the process of developing its technological capability through innovation, the firm must develop an appropriate organizational structure that facilitates effective communication flows across different departments and groups (Benazzouz, 1979; Lynn, 1985; Spinks and Wells, 1995; Kumar et al., 1999). Therefore it is hypothesized:

*Hypothesis H3: The firm with higher flexible organizational structure has a higher degree of ability to develop technological capability through innovation.*

**Procedures and systems.** According to Shenhar and Adler (1996), procedures and systems are the organizational routines and criteria guiding the way in which the firm is making decisions and disseminating information. Decision-making procedures and systems involve planning (e.g. recruiting practices and employee rewards), control (personnel performance criteria) and problem-solving. Information dissemination procedures and systems govern the flow of technical and business information. The difference between good and badly designed procedures greatly influences the ability of an organization to develop and exploit technology (Dodgson, 1993; Hedlund, 1994; Shenhar and Adler, 1996). Thus, it is hypothesized that:

*Hypothesis H4: The firm with higher flexible systems and procedures has a higher degree of ability to develop technological capability through innovation.*

**Absorptive Capacity**

Cohen and Levinthal (1990) introduced the absorptive capacity construct as the firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends. As noted by Levinson and Asahi (1997) absorptive capacity is the foundation for technical learning within an organization, as well as organizational and interorganizational learning in general. The existing level of firm’s absorptive capacity determines the extent to which the firm can actively increase its technological capability or create a distinctive set of technological capabilities (Cohen and Levinthal, 1990). Therefore, it is hypothesized:

*Hypothesis H5: A positive relationship exists between the firm’s absorptive capacity and its ability to increase technological capability through innovation.*

**Government Role**

Governments could play a positive role in the cultivation of technological capabilities of local firms through various policy instruments and initiatives. Possible actions include raising R&D spending, upgrading the country’s science and technology infrastructure, changing laws, procedures and organizational cultures that interfere with the innovation processes, setting incentive schemes, providing expertise, assisting in the development of human resources. Government role is especially important for Caribbean tourism (McDavid and Ramajeesingh, 2003) and therefore it is hypothesized:

*Hypothesis H6: Government role is positively related to the firm’s ability to develop its technological capability through innovation.*

**Technological Complexity of Innovation**
The complexity of an innovation is understood as “the nature, quantity and magnitude of organizational subtask interactions posed by the project” (Tatikonda and Rosenthal, 2000). One of the dimensions of the innovation complexity, the technological complexity, is considered especially important for the process of developing technological capacity through innovation (Rogers, 1995). Technological complexity of innovation project is defined as “the degree to which a technology is perceived as difficult to understand and use” (Rogers, 1995). It can have an impact on the organization’s ability to increase technological capability through innovation. Several studies have empirically investigated relationships between aspects of project complexity and project outcomes. It is also recognized that the more complex the innovation, the more an organization can learn from it. Therefore it is hypothesized:

**Hypothesis H7:** The level of technological complexity of innovation is positively related to the firm’s ability to develop its technological capability through innovation.

### Methodology and Results

This study is based on information obtained from 62 tourism organizations operating in Cuba that were involved in innovation projects. Both quantitative and qualitative data on the innovation projects were collected through a combination of personal interviews and a self-administered questionnaire. During the interviews, managers were asked to reflect upon the most recent innovation project with which they were personally involved and to answer the questions based on these projects. At the end of the interview session, respondents were then requested to fill in a structured questionnaire, in the presence of the researcher. The average length of the interviews was one hour. Respondents were senior executives who were involved in the innovation project. The data analysis technique employed is multiple regression analysis. Also, the qualitative responses are used to provide context for the statistical results obtained.

The sample consisted of hotels (61.9%), restaurants (21.4%), and other companies (16.7%), including travel agencies, transportation companies, tourist stores, and promotion and advertising agencies. The average age of the companies in the sample was 26.28 years and it ranged from 1 year to 95 years. Over half of the companies were operating for less than 10 years, 20% were between 10 and 30 years, and the remaining 30% were above 40 years. The number of employees ranged from 6 to 760 with the average being 186.59 employees per company. The workers in the company who graduated at a superior level represented on average 30.58% of the total number of employees, while the technicians represented on average 42.96% of the total number of employees.

The companies were undertaking different types of innovations. The most popular and frequently carried out innovations were product quality improvement and new product development (81% of companies in the sample were involved in product quality improvement and 52.4% in new product development). However, at the same time, several types of innovation were not developed frequently: only 23.8% of companies frequently carried out new process design and development of new markets, and even less, 21.4%, investigated new markets. It is noticeable that although companies recognized the need for innovation, they were focusing on the most traditional innovations: quality improvement and new product. Some examples of innovation projects investigated include among others: the implementation of software to automatically control inventories of a hotel, the introduction of ISO 9000 for quality control, the installation of an information system to connect two hotels, the redesign of communication system, the transforming a simple dancing room into a cabaret place, the introduction of an electronic display screen to advertise hotel services and facilities, a new elevator, a new management style, a new bar in the...
lobby of the restaurant, the installation of Intranet, the introduction of souvenir sales to the hotel, and the introduction of a computerized system to control switching on and off of lights.

The innovation projects investigated in this study were undertaken for a variety of reasons. The most important was to improve quality (55.6% of companies ranked it as one of the most important reasons). The second most important reason for innovation was to increase efficiency (45% of companies ranked it as one of the most important reasons). Other popular reasons were to improve competitive position on the market (quoted by 28.6% of companies) and to reduce costs (quoted by 27.8% of companies). However, increasing capacity, increasing profits, and increasing market share were not considered as important by most of the companies. The investigated projects faced several obstacles during their execution. The most serious obstacles were: financial and cash flow problems (faced by 43.9% of companies), problems with the decision making process (faced by 39% of companies), and policies and strategies problems (faced by 36.6% of companies). Less frequent, but still quite prevalent were problems such as: cultural issues (a serious inhibitor for 29.2% of companies) and ineffective training (faced by 14.6% of companies).

In order to analyze the data obtained from the survey the regression analysis was done, with technological capability as the dependent variable and the following independent variables: leadership and employee support, knowledge and technical expertise, group management skills, project management skills, learning culture, organizational structure, systems and procedures, absorptive capacity, government role, and technological complexity of innovation. Detailed descriptions of the variables and their measures are given in Table 1. For multi-item scales a simple average of the items was used as the scale measure. In order to check the internal reliability of multi-item variables, Cronbach alpha was computed for these variables. Its values ranged from 0.71 to 0.91 (see Table 2), which is considered satisfactory (Stevens, 2002). Before running the regression analysis, the independent variables were tested for multicollinearity and variance inflation factors were calculated for all of them (see Table 2). None of the factors exceeded the cut-off value of 10 (Stevens, 2002), so all of the variables were considered as potential variables explaining the variance in technological capability and included in the analysis. The backward elimination of variables was then performed to determine which variables should be included in the regression model in order to explain variance in technological capability. The final model included four out of ten independent variables: group management skills, project management skills, learning culture and government role. The regression results indicate that the four variables together explain 81% of the variation in technological capability ($R^2 = .815$) and the model is statistically significant at the .001 level (F-test). The results of the regression analysis are presented in Table 3 and are discussed by hypothesis below. Discussion of the qualitative responses obtained is incorporated in the discussion where they help to better explain the statistical results.

**Hypothesis 1 (Managerial Capabilities)**

The regression results show that two out of the four managerial skills included in the analysis are significant for the building of technological capability through innovation: group management skills and project management skills. The positive coefficient of group management skills confirms the hypothesized relationship with technological capability. The innovation project’s manager’s ability to foster group work and communication and interaction, creates opportunities for individual and organizational learning from innovation, and thus enables and improves the building of technological capability. However, at the same time, the negative coefficient obtained for project management skills is surprising and contradicts the stated hypothesis. The context of the research sample may provide some explanation of this relationship. Most of the innovation projects considered by the companies participating in the study were small invest-
ments and relatively low-tech activities undertaken by a team of committed employees. The project management skills of the managers and techniques used by them were stressing procedures, control, proper scheduling of tasks, and monitoring of the progress at each phase of the project, and did not promote group work, brainstorming, and learning. This suggests that, in this context, if project management skills are not applied properly or if they are too strict, they may become an obstacle to learning and development of technological capabilities. Findings from this study are supported by the analysis made by Dey (2002). He identified and investigated problems with project planning and management in the Caribbean such as frequent schedule changes, tight schedules, poor project definition, not enough care given to communication, quality, and risk assessment. These problems may explain the negative relationship between project management skills and technological capability. Another explanation can be tied to findings made by Smith (1997) who indicated that in projects which are unique, off-the-shelf procedures generally do not exist and the traditional focus on the mechanics of project execution can interfere with team work and learning. He also pointed out that tight schedules with critical deliverables create added uncertainty.

Another finding in the data from the regression analysis is that leadership and employee support, as well as knowledge and technical expertise were not significant. The reasons for this may be that the projects have been conducted more as a group undertaking, characterized by high group member involvement and commitment and therefore leadership and employee support by the managers did not make a significant difference (i.e., the employee commitment was already there: 73.1% of companies agreed that during the execution of the project the employees were totally involved in the project). As for knowledge and technical expertise of the manager it appears that this did not play an important role due to the nature of many of the projects, which were mostly low-tech undertakings where one could argue there was less need for a high level of knowledge and expertise. According to the surveyed companies, most innovation projects did not involve very difficult or complex technology. Over half of the respondents considered the technology easy to use and understand and agreed that the problems of the innovation projects were easily identified at the initial phase.

**Hypotheses 2, 3, and 4 (Organizational Elements)**

The hypothesis stating a positive relationship between learning culture and technological capability has been confirmed, but organizational structure, systems and procedures, did not turn out to be significant. The result regarding learning culture is not surprising: learning culture was defined as the organizational activities focusing on fostering learning processes (availability of training, encouraging employees to participate in trainings, encouraging of collaboration with universities etc.) and from the definition itself it is strongly related to learning and improving the technological capability of an organization. However, it was not expected that organizational structure, systems and procedures would not play a significant role. This finding can be explained by the nature of the innovation projects investigated and by the way the variables were measured. The projects surveyed were typically small-scale innovations executed by the teams consisting of existing employees in the company. Organizational structure facilitating the communication flow across different departments, different layers of management and with government ministry did not play a significant role in the execution of these projects, because these communication flows were not critical and project teams did not rely on them excessively. Qualitative data indicates that informal communication played a much more important role during typical project execution. Organizational systems and procedures also turned out not to be a significant variable, since most projects under consideration were not very structured and the use of information systems to share information or communicate goals was not an influential factor.
Hypothesis 5 (Absorptive Capacity)

Absorptive capacity, measured with a proxy as the natural logarithm of the ratio of graduates over technicians, turned out not to be significantly related to firm’s ability to cultivate technological capability. This finding can also be explained through the qualitative information provided by the respondents, who often reported that the technology involved in the project was very simple and therefore the availability of engineers and technical personnel was not an important consideration.

Hypothesis 6 (Government Role)

The hypothesis stating a positive relationship between government role and technological capability has been confirmed. The independent variable measured government role in developing the infrastructure, allocating resources, and developing human resources. The result obtained is reasonable and was expected, given the political situation of Cuba and the very important role of the government in providing the funding and resources for tourism innovation projects. As a result of the innovation project approval and funding procedure, receiving government support enhances the company’s opportunity to learn and increase technological capability. Also, as some of the respondents pointed out, the government’s expertise and experience shared during the innovation project helps the company build its knowledge base.

Hypothesis 7 (Technological Complexity of Innovation)

Technological complexity of the innovation turned out not to be significant to the development of technological capability through innovation. As with absorptive capacity, this result is related to the fact that the innovations undertaken by the companies involved mostly simple technologies.

Conclusions

The study investigated the relationship between innovation and technological capability in tourism companies in Cuba. Analysis of the data from survey confirmed hypotheses that group management skills, project management skills, learning culture, and government role are significantly related to the cultivation of technological capability in these companies. The results of the study can be useful for both academics and practitioners. For academics, the resulting model helps to better understand relationship between innovation and technological capability and to clarify the factors that affect this relationship. For practitioners, on the other hand, the study provides insight on how innovation activities in the tourism sector help develop technological capability and identifies important areas where actions can be taken to improve the benefits from innovation activities and cultivate technological capability.

Appendix

Figure 1
Conceptual model

Table 1

Description of dependent and independent variables

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Variable description and measures</th>
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<tbody>
<tr>
<td>Technological capability</td>
<td>Mastery of technology in terms of operating the technology; maintaining product quality and product safety; developing new products or processes; codeveloping a production process with the technology supplier; maintaining the technology; repairing when breakdown occurs; codeveloping a product with the technology supplier. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
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<table>
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<tr>
<th>Independent variables</th>
<th>Variable description and measures</th>
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<tr>
<td>Leadership and employee</td>
<td>Fostering a productive work environment; fostering the learning and development of individuals through special training; helping the employees to adapt a risky and uncertain environment; communicating effectively with all employees of the company. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
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<tr>
<td>Group management skills</td>
<td>Building multidisciplinary groups; mobilizing the efforts of the group; assisting in problem-solving. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
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<tr>
<td>Knowledge and technical expertise</td>
<td>Understanding by the manager the technology and trends in his area of responsibility and the business environment of his company; knowing the detailed rules and regulations relevant to the innovation project; having systems perspective in manager’s area of technical work; participating effectively in the search for integrate solutions and technological innovations; having technical credibility with scientists and engineers. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
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<tr>
<td>Project management skills</td>
<td>Managing cooperation among and across the various functions involved in the innovation project; scheduling the tasks; delegating the tasks effectively; analyzing progress at each phase of the project with the group. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
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<tr>
<td>Learning culture</td>
<td>Understood as availability of training when it is needed to improve skills and knowledge; employees feeling that acquiring knowledge and skills is an essential part of their job; managers and supervisors are encouraged to attend advance orientation programs or training program themselves; managers are encouraged to search and establish relationship with university and research center or other type of collaboration. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
</tr>
<tr>
<td>Systems and procedures</td>
<td>Policies and procedures that allow to work efficiently; the organization communicate to all employees at all levels about new changes (e.g. new strategy, new investments, new goals); information systems that make it easy for employees to share information; recruiting practices that enable to attract the best talent; reward systems that recognize the contribution made by employees. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the measure.</td>
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<tr>
<td>Organizational structure</td>
<td>The fact that the organizational structure facilitates the communication flows across different departments; the organizational structure facilitates the communication flows with different organizations within the ministry; the organizational structure facilitates the communication flows with different organizations outside the ministry; the organizational structure facilitates the communication flows between different layers of management; the organizational structure allows to make decision autonomously. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
</tr>
<tr>
<td>Absorptive capacity</td>
<td>Natural logarithm of the ratio of graduates over technicians. Natural logarithm transformation was done in order to obtain normally distributed variable.</td>
</tr>
<tr>
<td>Government role</td>
<td>Government role in infrastructure development, resource allocation, and human resource development. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
</tr>
<tr>
<td>Technological complexity of innovation</td>
<td>The technology related to the innovation project was easy to use; the technology was easy to understand; the problems with the technology related to the innovation project were easily identified at initial phase; new technology knowledge was needed to implement the technology; the employees were totally involved in this innovation project. Each of these items was measured on a 5-point Likert scale and the averages of the ratings were used as the variable measure.</td>
</tr>
</tbody>
</table>

**Table 2**

**Internal reliability and collinearity of the variables**
<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach alpha</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological capability (7 items)</td>
<td>0.8837</td>
<td>NA*</td>
</tr>
<tr>
<td>Absorptive capacity</td>
<td>NA**</td>
<td>1.432</td>
</tr>
<tr>
<td>Technological complexity of innovation</td>
<td>0.7071</td>
<td>2.642</td>
</tr>
<tr>
<td>Systems and procedures (5 items)</td>
<td>0.8061</td>
<td>2.143</td>
</tr>
<tr>
<td>Organizational structure (5 items)</td>
<td>0.8544</td>
<td>4.519</td>
</tr>
<tr>
<td>Government support</td>
<td>NA***</td>
<td>2.386</td>
</tr>
<tr>
<td>Learning culture</td>
<td>0.7055</td>
<td>2.621</td>
</tr>
<tr>
<td>M3 (group)</td>
<td>0.8477</td>
<td>7.756</td>
</tr>
<tr>
<td>M2 (knowledge)</td>
<td>0.8989</td>
<td>5.048</td>
</tr>
<tr>
<td>M1 (leadership)</td>
<td>0.9080</td>
<td>6.159</td>
</tr>
<tr>
<td>M4 (project management)</td>
<td>0.8975</td>
<td>4.181</td>
</tr>
</tbody>
</table>

* Technological capability is the dependent variable (no need to check its collinearity).
** Absorptive capacity is a variable consisting of a single measure (Cronbach alpha is irrelevant).
*** Government support is a variable consisting of a single measure (Cronbach alpha is irrelevant).

Table 3

Results of the regression analysis (dependent variable: technological capability)

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>(β)</th>
<th>S.E. (β)</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-0.569</td>
<td>0.628</td>
<td>-0.907</td>
<td>0.377</td>
</tr>
<tr>
<td>Group management</td>
<td>0.948</td>
<td>0.242</td>
<td>3.922</td>
<td>0.001</td>
</tr>
<tr>
<td>Learning culture</td>
<td>0.443</td>
<td>0.175</td>
<td>2.532</td>
<td>0.021</td>
</tr>
<tr>
<td>Resource allocation</td>
<td>0.294</td>
<td>0.086</td>
<td>3.425</td>
<td>0.003</td>
</tr>
<tr>
<td>Project management skills</td>
<td>-0.595</td>
<td>0.251</td>
<td>-2.374</td>
<td>0.030</td>
</tr>
</tbody>
</table>

R² = .815   F = 18.721   sig. = .001
References


World Travel and Tourism Council (WTTC) (1999). WTTC Key Statistics, WTTC.