An Economic Analysis of the Lao PDR Tourism Industry

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Since 2001, Lao PDR tourism sector ranked second in terms of foreign exchange earnings after the mining and quarrying sector. Over two million international tourists visited the country in 2010, generating US$313million tourism receipts (LNTA, 2010). The tourism sector is regarded as one of the fastest growing sector economies in the country. Despite its importance, there has been no in-depth analysis of tourism's contribution to the economy. This study investigates the economic impacts of tourism on the Lao PDR economy. Using a visitors' expenditure survey and input-output models, the tourism sector was disaggregated from rest of the economy. The economic multipliers and inter-industry linkages of the 14 economic sectors for 2003 and 2008 were analyzed using SimSIP SAM Software. Tourism stakeholders' perceptions of the country's tourism were also analyzed.

The results revealed that tourism is the leading sector in the country impacting positively on the economy during 2003-2008. Tourism contributed 7.5 percent to the national GDP and one in every seven people depended on tourism related businesses as their major employment in 2008. The multiplier results showed tourism contributes significantly to the economy in terms of generating output, value added and employment. However, the income multiplier was insignificant indicating high imports and relatively low income from tourism. The results further indicated that the indirect and induced impacts grew faster than the direct impacts of the tourism sector indicating tourism's secondary impacts are potentially important to the economy. The tourism normal and ratio multipliers are among the top three economic sectors demonstrating tourism substantial contribution on the economy.

The higher average backward and forward linkages of the tourism sector compared with other economic sectors during 2003-2008 imply the sector's greater dependency on the domestic economy. Inter-industry linkages analysis showed tourism is a key sector in creating demand and stimulating production within the sector as well as other sectors of the economy. Tourism stakeholders also perceived that tourism was a catalyst in expanding businesses and generated

positive impacts such as increased income, output and employment at local and national levels. The stakeholders also underlined some negative impacts such as cultural change, unsafe migration, human trafficking and the degradation of natural and heritage sites in the country.

Keywords: *Economic impacts, Input-output analysis, Multipliers, Backward and forward linkages, Key sectors, Tourism, Lao PDR*

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List of Abbreviations

ADB	Asian Development Bank
B/FL	Backward/Forward Linkages
CBTA	Cross Border Transport Agreement
CGE	Computable General Equilibrium
EWEC	East West Economic Corridor
GDP	Gross Domestic Product
GMS	Greater Mekong Subregion
GNP	Gross National Product
GPP	Gross Provincial Product
GSP	Gross State Product
GVA	Gross Value Added
I-O	Input Output
I-O MPM	Input Output Multiplier Product Matrix
LNTA	Lao National Tourism Administration/Authority
Lao PDR	Lao People's Democratic Republic
MRI	Multi Rank Index
MTCO	Mekong Tourism Coordination Office
NGO	Non-Government Organization
NSC	National Statistics Centre
NSEC	North South Economic Corridor
PATA	Pacific Asia Travel Association
RAS	Row sum (R), Input Output Coefficient (A), Column sum (C)
ROL	Rest of Lao PDR
ROW	Rest of the World
SAARC	South Asian Association for Regional Cooperation
SAM	Social Accounting Matrix
SEA	South East Asia
SimSIP SAM	Simulation for Social Indicators and Poverty and Social Accounting Matrix
SNV	Netherland Development Organization
SSR	Self Sufficiency Rate
TDI	Total Domestic Input
TFD	Total Final Demand
TGI	Total Gross Input
TGO	Total Gross Output
TII	Total Intermediate Input
TL	Total Linkages
TSA	Tourism Satellite Account
TWG	Tourism Working Group
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNWTO	United Nations World Tourism Organization
USD/$/m/b	United States Dollar in million/billion

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Chapter 1
Introduction

1.1 An overview of the Greater Mekong Subregion cooperation programme

The Greater Mekong Subregion (GMS) comprises Cambodia, Lao PDR, Myanmar, Thailand, Vietnam and China (Yunnan and Guangxi Provinces) (see GMS map in Appendix 1). Economic cooperation among the GMS nations was initiated in 1992 by the governments concerned with the help of the Asian Development Bank (ADB) to initiate broader economic activity in the subregion (ADB, 1996). Following the 1997 Asian financial crisis, the GMS countries decided to construct three major economic corridors, namely, the East West Economic Corridor (EWEC), the North South Economic Corridor (NSEC) and the Southern Economic Corridor (SEC), for better connectivity in the subregion. The GMS economic corridors linked the subregion's fragmented road networks to promote trade and tourism businesses with South, South East and North East Asia, further enhancing the strategic location of the GMS as the land bridge between the regions (Furukawa & Termpittayapaisith, 2000). The economic corridors, along with other sub-corridors, would benefit tourism and tourism related business in the GMS by easing the cross-border movement of people.

The EWEC and NSEC are the two main corridors that link the five GMS countries (China, Lao PDR, Myanmar, Thailand and Vietnam) except Cambodia, which links with the SEC. The two corridors are among 13 priority tourism corridors, zones, circuits, and lines identified in the GMS Tourism Sector Strategy 2006-2015 (ADB, 2005, p.26). The implementation of the GMS Cross Border Transport Agreement (CBTA) was necessary for a GMS-wide single visa and the upgrading of key border checkpoints that facilitate the movement of goods and people across borders. The implementation of the CBTA and border harmonization minimizes the immigration and customs obstacles that constrain cross-border tourist travel. According to the Mekong Institute (2008), the agreement addresses the relevant aspects of cross-border transport facilitation including single-window inspections; a transit traffic regime; the cross-border movement of persons; the exchange of commercial traffic rights; and harmonized standards of the road transport network. The core GMS programmes facilitating international visitors' movement include the GMS-wide single visa scheme, upgrading of key border check points and the information databank, and the monitoring of progress on travel facilitation initiatives in the subregion (ADB, 2008, p.44).

1.2 Economic corridors and regional tourism development around the world

Furukawa and Termpittayapaisith (2000, p.35) defined economic corridors as geographic areas where infrastructure development is linked with the development of production and trade and investment potential through systematic intervention. Rieder (2008) identified that the main characteristics of economic corridors included gateway development nodes, intermediate development nodes, cross border facilities, transportation linkages, borders, transit agreements, and corridor landscape. Similarly, ADB (2008a) reported that an economic corridor promotes regional economic cooperation on trade and transport, easing the movement of people and goods. Economic corridors cover smaller, defined geographical space usually straddling a central transport artery such as a road, rail line or canal. The economic corridor highlights the physical planning of the corridor and its surrounding area, to concentrate infrastructure development and achieve most positive benefits for the community, country and the subregion (ADB, 2008). The following section provides an overview of the economic corridors and their contribution to tourism development at the regional level:

- The Euro Economic Corridor in Europe, the Mercosur Economic Corridor in South America and the Northern Corridor Economic Zone in Central Africa are among the known economic corridors. The Euro Economic Corridor links France, Belgium, the Netherlands, Germany and Luxemburg. The Mercosur Economic Corridor was developed for South American countries. The Northern Corridor Economic Zone in Central Africa includes Congo, Burundi, Rwanda, Uganda and Kenya (Transit Transport Coordination Authority, 2009).
- Mercosur (Spanish) or Mercosul (Portuguese), meaning "Southern Market", comprising Argentina, Brazil, Paraguay, Uruguay, Chile, Bolivia, Peru, Columbia and Venezuela, was developed in 1991. Mercosur has two main objectives: free trade between member countries and a common external trade policy (Ghimire, 2001). Tourism was not included directly in the main objectives but other factors such as harmonization of customs, investment policies and the development of transport have an indirect influence on the expansion of tourism in the region (Ghimire, 2001).
- The European Commission on Tourism and the renewed Lisbon Strategy (2006) decided to consult the Economic and Social Committee under Article 262 of the Treaty to establish the European Community on the renewed strategy of the European Union Tourism Policy towards a stronger partnership for tourism. The policy paper stated that the committee once again proposed and recommended that the cooperation policy should be further developed by setting up a European Tourism Board/Agency.

- At the Twelfth Summit of the South Asian Association for Regional Cooperation (SAARC) held in Pakistan in 2004, the leaders agreed that development of tourism within South Asia could bring economic, social and cultural dividends to the region. The Working Group on tourism was established by the Council of Ministers in 2004 and South Asia celebrated 2005 as "South Asia Tourism Year" (SAARC, 2006). The Working Group made a number of recommendations for the promotion of tourism in the region including sustainable development of ecotourism, cultural and nature tourism, and cooperation in tourism with other relevant regional and international tourism organizations (SAARC, 2006).
- The special committee on Sustainable Tourism of the Association of the Caribbean States formed the Sustainable Tourism Zone of the Caribbean in 2001. The Association recognized the importance of tourism development in forming a zone of 29 small countries, which are a geographically rich and diverse unit for the tourism development of the Greater Caribbean.
- The Southern African Development Committee aimed to bring accelerated economic growth, create more jobs and reduce poverty through promoting tourism in the region (Ghimire, 2001). In the context of regional cooperation, the tourism sector set the goal of maximizing tourism's contribution to regional development through the generation of foreign exchange earnings, employment creation, human resources and rural development (Ghimire, 2001).

1.3 Tourism in the Greater Mekong Subregion

Since 1993, GMS cooperation in tourism has been coordinated by the Tourism Working Group formed by representatives of the national tourism organizations with the Agency for Coordinating Mekong Tourism Activities (AMTA) as its secretariat. The Mekong Tourism Coordination Office (MTCO) has now replaced the AMTA and provides a sustained organizational capacity to address subregional tourism issues in the GMS countries including the Lao PDR. The MTCO, with the help of the ADB, is focusing on eight priority GMS tourism programmes namely: 1) destination marketing, 2) subregional events, 3) training, 4) management of natural and cultural resources, 5) Mekong River tourism development, 6) facilitation of travel, 7) village-based tourism, and 8) GMS tourism flows (ADB, 2005).

The GMS countries have adopted a 10-year Tourism Sector Strategy (2006-2015) giving priority to growing the tourism sector (ADB, 2005). The objective of the strategy is "to develop and promote the Mekong as a single destination, offering a diversity of good quality and high-yielding GMS products that help to distribute the benefits of tourism more widely;

add to the tourism development efforts of each GMS country; and contribute to poverty reduction and sustainable development, while minimizing any adverse impacts" (ADB, 2005). The strategy builds on the 'Mekong Brand Tourism'– a brand that will showcase of the GMS incomparable beauty, diversity and spirit, and bring people a better quality of life, and the popularity of the gateways and tourist hubs to link the GMS into priority tourist zones. The tourism development is based on the principles of sustainable tourism development where the GMS countries must have the capacity to develop tourism as economically viable and ecologically sound with minimal social impacts on local communities (ADB, 2003). The GMS Tourism Sector Strategy (2006-2015) envisages 29 tourism projects; 13 are spatial and 16 are thematic activities dealing with specific GMS-wide intervention (ADB, 2008).

Tourism is one of the nine GMS flagship programme initiatives by GMS countries along with the economic corridors' development programme (ADB, 2005). In 2007, GMS countries received about 26 million international visitors (an increase of 11% from 23 million in 2006) generating estimated receipts of US$19b and employing around four million people. In addition, visitor arrivals to the GMS increased by eight percent per annum- more than twice the world average from 1995-2007 (MTCO, 2008, p. 6-7). As a result, the GMS share of world tourism increased over this period from 2.2 to 2.9 percent and its share of the Asia Pacific Region from 11 to 14 percent.

Table 1.1 shows the trends in international visitor arrivals in GMS countries during 1995-2007. The total visitor arrivals in Lao PDR in 1995 were 346,000, which grew annually by 13 percent thereafter. Visitor arrivals in the GMS grew at an annual rate of 8.7 percent during the same period. The market share of the total visitors of Lao PDR to the GMS was 3.5 percent in 1995 and reached 6.1 percent in 2007.

Table 1.1 International visitor arrivals in Greater Mekong Subregion, 1995-2007.

GMS countries	Arrivals ('000)		Average annual growth (%)	Market share (%)	
	1995	2007		1995	2007
Cambodia	220	2,015	22.0	2.2	7.5
Lao PDR	**346**	**1,624**	**13.0**	**3.5**	**6.1**
Myanmar	120	248	10.6	1.2	0.9
China, Guangxi	419	2,005	19.0	4.2	7.5
China, Yunnan	597	2,219	12.0	6.0	8.3
Thailand	6,952	14,464	6.7	69.5	54.1
Vietnam	1,351	4,185	9.8	13.5	15.6
GMS Total	**10,005**	**26,760**	**8.7**	**100.0**	**100.0**

Sources: MTCO (2008) and United Nations World Tourism Organization (UNWTO) (2008)

Table 1.2 shows the gross receipts from international tourism in GMS countries during 1995-2007. GMS's gross receipts increment from international tourism is about five percent per annum but Lao PDR reported an increase of 12 percent per annum during the same period. The market share of international tourism receipts in Lao PDR increased more than two fold from 0.6 to 1.5 percent during 1995-2007. The GMS-wide single visa and cross border agreements are likely to boost tourist flow once they are implemented (ADB, 2008).

Table 1.2 International tourism receipts of Greater Mekong Subregion, 1995-2007.

GMS Countries	Receipts (million US$)		Average Annual Growth Rate (%)	Market Share (%)	
	1995	2007		1995	2007
Cambodia	53	1,400	28.6	0.6	8.9
Lao PDR	**51**	**233**	**12.4**	**0.6**	**1.5**
Myanmar	151	84	-5.7	1.8	0.5
China, Guangxi	1	4	9.6	0.1	0.1
China, Yunnan	16	62	16.0	0.2	0.4
Thailand	8,035	10,108	1.4	95.7	64.6
Vietnam	85	3,756	28.7	1.0	24.0
GMS Total	**8,393**	**15,648**	**4.9**	**100.0**	**100.0**

Source: United Nations World Tourism Organization (2007)

Table 1.3 shows the percentage of GDP, exports and employment in the GMS countries' tourism sector in 2006. The tourism sector contributed nine percent to Lao PDR national GDP (GMS: 12%) whereas tourism exports were 20 percent of total exports (GMS: 19%) in 2006. Similarly, tourism contributed seven percent of the total jobs in Lao PDR compared with nine percent in the GMS countries.

Table 1.3 Tourism as a percentage of Gross Domestic Product, exports and total employment in Greater Mekong Subregion (2006).

Item	Cambodia	Lao PDR	Myanmar	China	Thailand	Vietnam	GMS
Tourism GDP	19.6	**9.3**	4.3	13.7	14.3	10.9	12.0
Tourism Exports	19.5	**20.6**	3.3	3.6	10.6	3.5	10.2
Tourism Jobs	15.4	**7.3**	4.0	10.2	10.7	8.7	9.4

Source: ADB (2008)
Note: Tourism GDP is expressed as the percentage of National GDP; tourism exports are expressed as percentage of total exports; and tourism jobs are expressed as the percentage of total jobs in the country/region.

Table 1.4 shows the key tourism indicators of the GMS countries in 2010. The World Travel and Tourism Council (2010) estimated that tourism contributed 11 percent to the Lao PDR's GDP in 2010, which is similar to the GMS average contribution. For example, the tourism sector contributed 18 percent to Cambodia's GDP. The tourism exports of Lao PDR were 15 percent, the second highest among the GMS countries followed by Cambodia at 27 percent

whereas the GMS average was only 11 percent. In addition, about nine percent employment is supported by the tourism sector in the Lao PDR. The GDP growth by the tourism sector was expected to be three percent in the Lao PDR compared with four percent in the GMS in 2010.

Table 1.4 Key tourism indicators of the Greater Mekong Subregion in 2010.

Country	Tourism GDP (%)	Tourism exports (%)	Tourism jobs (%)	Tourism GDP growth (%)
Cambodia	18.4	26.8	14.3	4.9
China	9.2	3.3	7.7	6.5
Lao PDR	**11.5**	**15.5**	**9.2**	**2.7**
Myanmar	5.7	1.2	5.2	4.5
Thailand	13.9	10.8	10.4	1.6
Vietnam	12.4	6.7	9.9	3.4
GMS Average	11.9	10.7	9.5	3.9

Source: World Travel and Tourism Council-WTTC (2010) reports of the six GMS countries

Tourism has made a significant contribution to the GMS countries' economies where its share of national GDP averaged 12 percent in 2006 (MTCO, 2008a). Similarly, the collective share of international tourism exports was 10 percent of the GMS countries' total exports and employment generation by the sector contributed over nine percent of the region's total employment. The total arrivals to the GMS are projected to grow by almost 13 percent per annum to 52 million by 2015, around four percent of global tourism (UNWTO, 2008).

Table 1.5 shows the indicative targets for the GMS tourism sector set by the GMS countries (including Lao PDR). The forecasted international visitor arrivals to the GMS borders were 32 million in 2010. According to the GMS countries target, the international arrivals will triple by 2015 (52 million) compared to 16 million in the base year of 2004. The total share of arrivals for the five GMS countries (except Thailand) is forecast to be 41 percent in 2015. The increment is based on the rapid development of tourism infrastructure including the economic corridors and the implementation of CBTA that facilitate the movement of people in the GMS. In an effort to improve intraregional transport and maximize the benefits derived, GMS countries have begun to adopt a holistic development approach in the form of economic corridors (ADB, 2005). In developing these economic corridors, investment in infrastructure such as transport, telecommunications, energy, and tourism will focus on the same geographic space to maximize development impacts while minimizing development costs in the GMS.

Table 1.5 Targets for the Greater Mekong Subregion tourism sector.

Target	Indicators	2004	2010 *p*	2015 *p*
Volume of international visitor arrivals and economic benefits	• Arrival at GMS borders (million)	16.4	31.9	52.0
	• Total tourism receipts ($billion)	14.8	29.5	52.4
	• Total output ($billion)	22.2	44.3	78.8
	• Total income ($billion)	18.6	39.2	69.3
	• Government revenue ($billion)	2.3	4.6	8.2
	• Employment (million jobs)	3.8	5.5	7.3
Distribution of international visitors and its benefits to the GMS countries (except Thailand)	• Share of total arrivals (%)	31	33	41
	• Share of total receipts (%)	29	30	43
	• Share of total income (%)	21	22	37
	• Economic linkages (%)	34	32	24
Poverty reduction	• Estimated number of people lifted out of poverty	-	132-158 thousand	1.0-1.2 million

Source: ADB (2005)
Note: '*p'* shows projected figure.

1.4 Tourism in Lao PDR

1.4.1 Visitor arrivals, gross receipts and tourism development efforts

The completion of the economic corridors and the partial implementation the CBTA resulted in an increase in the movement of people and goods in the GMS. There are currently nine land borders in Lao PDR that provide visa-on-arrival facilities, 16 that require pre-obtained visas, and 20 that are open only to border pass travellers, i.e., residents of adjacent provinces in Lao PDR (ADB, 2005, p.6). The immediate benefit of the economic corridors to tourism was the improved connectivity easing visitors' movement in the neighbouring countries resulting in reduced travel time and transportation costs (Luanglatbandith, 2007). Lao PDR is the only country that connects the other five GMS countries therefore, Lao PDR can position itself to be a land-linked crossroads of commerce, cooperation and tourism in the subregion (see map of Lao PDR in Appendix 1).

Tourism is regarded as an important contributor to economic growth and employment creation in Lao PDR. The ADB (2008) reported tourism is an important sector in the Lao PDR's socio-economic development plan for 2006-2010. Tourism-related industries also make a significant contribution to economic activity because they benefit from strong international visitor arrivals in Lao PDR (World Bank, 2009). The economic growth of the country has accelerated in the last eight years to an average of seven percent per annum since 2000 with a growth rate of eight percent in 2008 (UNWTO, 2008).

Table 1.6 shows the gross revenue from exports of major economic sectors during 2003-2008 in Lao PDR. Since 2001, the tourism sector ranked at least second in Lao PDR in terms of

total gross revenue contribution to the economy (first in 2005). The Statistical Report on Tourism in Lao PDR (2008) reported that international visitor arrivals in 2003 decreased due to the spread of the SARS epidemic in Asia. However, since 2004 the tourism industry has recovered. The number of international visitor arrivals continued to increase in 2008 with 1.74 million tourists generating a total revenue of US$275m (see Table 1.6).

Table 1.6 Gross revenue from exports by the major economic sectors in Lao PDR (million US$).

Products/ Industries	2009		2008		2005		2003	
	Revenue	**Rank**	**Revenue**	**Rank**	**Revenue**	**Rank**	**Revenue**	**Rank**
Minerals	539.4	1	801.9	1	128.3	2	46.5	5
Electricity	274.5	2	97.1	4	94.6	4	97.3	1
Tourism	**267.7**	**3**	**275.5**	**2**	**146.7**	**1**	**87.3**	**2**
Garments	141.7	4	255.0	3	107.5	3	87.1	3
Agriculture	77.0	5	47.9	6	26.6	6	11.1	8
Timber	46.0	6	59.3	5	74.0	5	69.9	4
Handicrafts	4.7	8	3.4	8	2.7	9	12.4	7
Other Industries	31.1	7	30.0	7	11.9	7	17.1	6

Source: LNTA (2008) and (2009)

Table 1.7 shows the number of international visitors, average length of stay and average expenses of visitors in Lao PDR. The LNTA (2008) found that, in 2007, visitors spent an average of US$34 per day and stayed an average of seven days in the country. This resulted in an average of US$142 per tourist per trip to Lao PDR. The LNTA (2008) projected that the tourism industry should continue to grow at four percent per annum over the next 10 years.

Table 1.7 Number of visitors, average length of stay and average expenses of international visitors in Lao PDR (2001-2009).

Year	Number (millions)	Average length of stay (day)	Average expenses /visitor/day (US$)
2001	0.674	5.2	30
2002	0.773	4.3	36
2003	**0.636**	**4.0**	**34**
2004	0.895	4.3	31
2005	1.096	4.5	30
2006	1.215	4.5	32
2007	1.632	7.0	34
2008	**1.743**	**6.5**	**NA**
2009	2.008	7.0	NA
2010*	2.125	7.8	NA
2013*	2.522	8.4	NA
2015*	2.865	8.8	NA

Source: Years 2001-2006 from World Bank (2009), LNTA (2008)
Note: * Projected figures by LNTA (2009), NA = Not Available

Lao PDR major tourist destinations are Luang Prabhang, Luang Namtha along the NSEC and Savannakhet along the EWEC and the capital city, Vientiane, (see Appendix 1 for Lao PDR map). There are 20 National Protected Areas (NPA) that cover nearly 14 percent of the country. Lao PDR's NPA system is recognized as one of the best-designed NPA systems in the World (LNTA, 2007). These destinations offer a range of tourist attractions in Lao PDR among the large tracts of tropical monsoon forest, diverse wildlife populations and dozens of ethnic minority groups (Harrison & Shipani, 2007). Lao PDR has also established border economic zones along the EWEC and NSEC including custom facilities, immigration, hotels and casinos in order to ease the movement of people and goods (Tsuneishi, 2009). The LNTA (2007) reported that the number of visitor arrivals in the major provinces increased substantially in 2006 compared with 2001. Luang Prabhang reported a 196 percent and Bokeo a 94 percent increment; Vientiane and Savannakhet both reported a 70 percent increment in visitor arrivals during the same period. The NSEC of Lao PDR is a new destination for visitors with a variety of natural and cultural attractions (Harrison & Shipani, 2007).

Luanglatbandith (2007) found a 75 percent reduction in travel time between Lao PDR and Vietnam after the construction of the EWEC. During the past five years, growth in this transport sector has been substantial with the number of passengers increasing by 160 percent along the corridor and the number of freight operators doubling between 2000 and 2005 along the EWEC (Luanglatbandith, 2007). Luanglatbandith reported that during the past five years the value of imports has increased about four times (from US$32m in 2001 to US$125m in 2005) whereas exports have expanded by about three times (from US$63m to US$152m) in Savannakhet in 2005. In terms of Foreign Direct Investment (FDI) and joint ventures, FDI flows along the EWEC increased by US$250m during 2000-2005 from US$96m during 1995-2000. More importantly, FDI alone amounted to US$422m in 2006 in the country.

A survey conducted in 2008 by the LNTA of 1,000 international visitors found that 83 percent visited the natural protected areas in Lao PDR. The survey results also showed that most international visitors' motivations for nature-based activities were strongly linked with the desire to visit rural settings and ethnic minorities in the country. Lao PDR has started to implement regional policies and projects to build infrastructure, promote investment and facilitate cross border procedures to attract more visitors. It has expanded investment opportunities for tourism related businesses by allowing 100 percent foreign ownership of hotels and restaurants and up to 70 percent of tour companies. These provisions have attracted foreign investment in the tourism sector in the country (LNTA, 2008).

1.4.2 Hotels, restaurants and travel agents in the Lao PDR

Table 1.8 describes the profile of Lao PDR tourism facilities such as hotels, restaurants and entertainment establishments. The table shows that, in 2008, there were 265 hotels, 1,120 guest houses, 742 restaurants and 164 entertainment houses in the country. The hotels had 8,803 rooms and 12,798 beds to meet the visitors' demands in the country. Similarly, a total of 13,370 rooms and 18,721 beds were available in guest houses in the country (LNTA, 2009). In terms of the total number of hotels, in 2009, Vientiane has 175 hotels (49%), Pakse and Luang Prabhang each has 41 hotels (12%) and rest of the country 100 hotels (27%).

Table 1.8 Hotels, restaurants and travel agents in Lao PDR (2003, 2008 and 2009).

	Hotels			**Guest houses**			**Restaurants**			**Entertainment**		
	2003	**2008**	**2009**	**2003**	**2008**	**2009**	**2003**	**2008**	**2009**	**2003**	**2008**	**2009**
Vientiane	37	114	175	126	185	187	85	69	86	21	92	116
LP	14	31	41	123	161	201	65	54	113	3	2	8
Pakse	22	35	41	84	119	135	12	18	18	4	15	12
ROL	59	85	100	422	655	821	427	601	931	44	55	174
Total	**132**	**265**	**357**	**755**	**1,120**	**1344**	**589**	**742**	**1148**	**72**	**164**	**310**

Note: LP = Luang Prabhang, and ROL = Rest of the Lao PDR
Sources: LNTA (2003, 2008, 2009)

The Lao Hotel and Restaurant Association (LHRA), which is a member of the Lao National Chamber of Commerce and Industry, is promoting and disseminating members' information to international markets. Similarly, the Lao Association for Travel Agents (LATA) coordinates all travel agents in the country and facilitates market access, business to business linkages and partnerships among tour operators and investors in the international market (LNTA, 2009). In 2008, there were 143 travel agents with 65 branch offices located in the country. Among them, 80 were located in Vientiane, 16 in Luang Prabhang and 14 in Pakse (LNTA, 2009). Currently, LATA is financially supported by the EU, the Netherlands Development Organization and the Japan International Cooperation Agency (LNTA, 2009).

1.4.3 Number of tourist destination sites in the Lao PDR

Table 1.9 shows the number of tourist sites in the Lao PDR in 2009. The 2009 Statistical Report on Tourism in Laos (LNTA, 2009) reported there were 1,493 tourist sites (849 natural, 435 cultural and 209 historical sites) in the country. Champasak Province (Pakse) has the highest number of tourist sites, 195 (103 natural, 59 cultural and 33 historical sites), followed by Luang Prabhang with 170 (119 natural, 32 cultural and 19 historical sites) and Vientiane with 167 (116 natural, 24 cultural and 27 historical sites).

Table 1.9 Number of tourist destination sites in the Lao PDR (2009).

Province/city	Natural sites	Cultural sites	Historical sites	Total
Luang Namtha	26	34	12	72
Luang Prabhang	119	32	19	170
Khammouane	95	25	3	123
Champasak (Pakse)	103	59	33	195
Vientiane City	116	24	27	167
Rest of Lao PDR	390	261	115	766
Total	**849**	**435**	**209**	**1,493**

Source: LNTA (2009)

1.4.4 Donor community, NGOs and INGOs involved in the Lao PDR tourism sector

The ADB along with the New Zealand Agency for International Development (NZAID), the Japanese Government, the Netherlands Development Organization (SNV) and United Nations Educational, Scientific and Cultural Organization (UNESCO) are the major donors and external stakeholders involved in the development of the tourism sector in Lao PDR. In early 2000, NZAID supported the development of a model of pro-poor tourism in the country. Similarly, the ADB provided US$30m assistance to the Mekong Tourism Development Project in 2002. The aim of the project is to improve tourism-related infrastructure such as roads and airports; one third of the funds have been allocated to Lao PDR (Harrison & Shipani, 2007). Since 2006, SNV has invested in the tourism supply chain facilities development programme to develop tourism goods and souvenir development shops and tourism value chains along the economic corridors.

UNESCO is supporting the preservation of world heritage sites in Luang Prabhang and other historical sites such as the Plain of Jars and Vat Phou in Champasak. Additionally, UNESCO is working against prostitution, the spread of communicable diseases and is concerned about such negative impacts of tourism in the Lao PDR. The German Development Cooperation (GTZ) is currently helping in tourism marketing brand development and promotion through the Lao PDR's national tourism board. Likewise, the Luxembourg Agency for Development Cooperation is contributing to human resources development programmes in the country's tourism sector. Green discovery, an NGO, is promoting Lao PDR tourism by publishing magazines, updating websites, running videos and producing TV programmes; its site offices are located in major tourist destinations in the country such as Luang Prabhang, Luang Namtha, Vang Vieng, Khammoune, Vientiane and Champasak (Pakse). Similarly, Ecotourism Laos, with the support of the LNTA, is promoting ecotourism destinations in the country.

1.5 Research problem

Tourism development plays a major role in the socio-economic improvement of the people residing along the economic corridors. The main objective of the economic corridors is to open up more business opportunities for local people through cross border trade and tourism. Table 1.10 shows international visitors' expenditure during 1997-2004 in Lao PDR. LNTA (2006) reported that the international visitors spent less money on local transportation since the opening of the economic corridors in Lao PDR. In 1997, international visitors spent 40 percent of their expenditure on local transportation but by 2007 it had decreased to 17 percent. LNTA further reported that this is a reflection of the poor road infrastructure before the construction of the economic corridors, between late 1990s and early 2000s, which forced many tourists to travel by air. Since roads have improved in the different parts of the country in recent years, the cost of transportation has been reduced (LNTA, 2006).

Table 1.10 Distribution of the international tourist expenditure in Lao PDR during 1997–2004 for selected years (numbers are in %).

Year	Accommodation	Food and beverages	Souvenirs	Entertainment	Local transport	Others
1997	22	16	16	2	40	4
2001	20	20	14	5	35	6
2003	21	26	13	5	30	5
2004	28	19	14	12	17	10

Source: LNTA (2006)

The economic corridors pass through scenic landscapes that contain a variety of the natural, cultural and historic tourism resources of Lao PDR. Before the construction of the economic corridors, these areas were not accessible to most international visitors. The Lao PDR government has implemented Special Economic Zone incentives along the EWEC in a five kilometre wide corridor, creating the potential for ribbon development along the route (SNV, 2007, p.156). Similar economic zones have also been established along the NSEC. Additionally, the government has improved the Luang Namtha and Houayxay airports, accommodating medium sized aircraft from the subregion with the support of GMS flagship programmes initiated by the ADB (Oula, 2005).

These developments, along with a good transport network, are enhancing the increase in international visitor arrivals in Lao PDR (Oula, 2005). However, the tourism development plan has not been closely integrated with the transport development strategy along the economic corridors; thus there are minimal opportunities in the tourism sector for the people and the country (SNV, 2007). Visitor arrivals in Lao PDR depend heavily on neighbouring

countries such as Thailand and Vietnam, which accounted about two thirds of total arrivals in 2006 (World Bank, 2009). There is strong potential for tourism growth in the economic corridors in Lao PDR (ADB, 2005). For this reason, some activities under the GMS Tourism Development Flagship Initiative directly impact on the economic corridors. These include potential tourism infrastructure projects along with tourism marketing and promotional materials that are being prepared by the MTCO with the assistance of the ADB. The GMS Tourism Sector Strategy (2006-2015) is supporting the Lao PDR tourism sector to build human and institutional capacity, ensuring a more equitable distribution of benefits and developing safeguards to protect minorities. Lao PDR is receiving the benefits from the regional tourism development initiatives since the country is still not considered a major tourist destination in the GMS (Harrison & Shipani, 2007).

Lao PDR, a land locked country, is one of the least developed countries, politically isolated and centrally controlled closed economy along with its subsistence economy, faces diverse challenges compared to its neighbouring countries. The contribution of the GMS tourism development approach is regarded as important factor for the national tourism development of the Lao PDR. In terms of regional issues such as visa scheme (GMS-wide single visa), tourism marketing and promotion and the development of economic corridors are important for the development of tourism in the Lao PDR.

Keating and Kriz (2008) revealed that nine major factors affect tourist destinations: natural resources, general infrastructure, tourist infrastructure, leisure and recreation, art, history and culture, political and economic aspects, environmental aspects, social aspects and atmosphere. Tourism has been on the rise in Lao PDR since the opening of the economic corridors but much work is needed for the sector to fully benefit from tourism along the economic corridors (Luanglatbandith, 2007).

LNTA (2006) showed the ratio of total employment to the number of international arrivals is approximately 22 to one in the tourism sector, but in Thailand the ratio is one employee to every three to five tourists. This shows that the Lao PDR tourism sector still lacks efficient human resources to provide better services to visitors. The National Tourism Development Plan (LNTA, 1998) of the Lao PDR estimated the tourism leakage (imports) factor was about 70 percent in the country but this needs to be independently verified. The LNTA (2006) documented that the overall leakage is about 56 percent, that is of every US$100 spent by tourists, only US$44 actually remains in the economy. The tourism output multiplier shows that the visitors' expenditure circulates 1.31 times in 2004 in the Lao PDR economy (LNTA,

2006). The country suffers from high leakage because many essential goods and services must be imported and tourism profits are repatriated to other countries.

UNESCAP (2004) reported that developing countries such as Lao PDR lack the technical expertise to gather adequate data to generate the necessary information to measure the economic impacts of tourism. The ADB (2005) also mentioned that the definitions, collection methodologies, data scope and systems used to store and retrieve data vary between the GMS countries. Lao PDR faces problems such as a lack of harmonization of the statistical data collected on the demand and supply of international visitors and the lack of data on the economic impacts of tourism at the national level. Other associated problems include a lack of a proper national accounting system and inaccurate computation of foreign exchange earning activities and estimating the economic impacts of tourism in the country.

1.6 Justification of the research

Tourism's importance is gaining widespread recognition as developing countries view the tourism industry as a cushion for their economic development and growth (Mazumder, Ahmed, & Raquib, 2011). Tourism is rapidly becoming the major source of foreign exchange for Lao PDR. Tourism in Lao PDR is regarded as an important employer with the ability to spread its economic benefits to the community and the nation. The Resolution of the 4th Congress of the Lao People's Revolutionary Party reads "Tourism is an important component for opening up the country and a potential revenue source" (LNTA, 2006). Since 1995, tourism, together with other development initiatives, has received serious attention to make Lao PDR a new and most attractive tourist destination in the GMS.

Visitor arrivals grew at 13 percent per annum during 1995-2008 (LNTA, 2008). Over two million tourists visited Lao PDR in 2010, generating US$313m gross tourism receipts in the economy (LNTA, 2010). Lao PDR received the 'International Ecotourism Spotlight Award' for two successive years, 2008 and 2009 (Ecotourism Laos, 2009). The country also featured in the New York Times in 2008 as one of the 10 most interesting places in the world to visit. In addition, the country also hosted two international ecotourism conferences, in 2007 and 2009 (Ecotourism Laos, 2009), and believed that these events had attracted many international visitors and stakeholders to the country. In the last decade, tourism has been one of the fastest growing sectors of the economy and has become particularly important for generating economic output, income and employment in the country (LNTA, 2010).

Despite the fast growth in the tourism sector, there has been no in-depth analysis of the economic contributions of the tourism sector to the country's economy. What is uncertain is how important the tourism sector is to the country in terms of its total economic impact in the country. One of the important aspects of this study is to fill the research gap estimating the impacts by deducting imports from the final demand of the tourism sector, which has not been done in previous tourism research in the Lao PDR. The analysis of the tourism sector's contribution to the Lao PDR economy needs detailed study on how the tourism sector interacts with the other sectors so that the impacts can be traced through the economy. For example, the total impacts from the increase in demand in the tourism sector do not just generate income, output and employment in the tourism sector but also create economic linkages in different sectors of the economy engaged in supplying inputs to the tourism sector. Therefore, it is essential to understand how well the tourism sector has inter-linked with the different economic sectors in the country.

The advantages of increased tourist inflow are quite evidence in the country and should be assessed on the basis of distinct values and identities of the tourism sector. Despite developing an Input-Output (I-O) table at the provincial (Savannakhet economy) and national level, the Lao PDR has not investigated the inter-industry linkages within the economic sectors in the country. The literature on tourism and its economic impact in many countries has been well documented but the literature on the Lao PDR tourism is marginal. No previous research has focused on the economic impacts of tourism in Lao PDR. As tourism is not a distinct sector in the industrial classification of the Lao PDR national accounts, there is no quantitative analysis of tourism impacts on the country. A review of literature on the country's tourism sector clearly indicates that there is a need to assess the economic impacts of tourism on the country's economy. Further, it is necessary to identify economically high potential tourism businesses, international tourist markets, economic multipliers and the tourism inter-linked sectors of the Lao PDR.

One of the biggest problems in studying the impacts of tourism in Lao PDR is availability of data from the national accounts. The Asian Development Bank provides assistance to the country's National Statistics Centre, to develop the national accounts including I-O tables. National accounts of Lao PDR recognize only the hotel and restaurant sector as tourism sector (see NSC, 2008). But the scope of tourism is larger and wider than just hotel and restaurant sector. No previous studies have given tourism the sole importance in their research. It is important to understand where the tourism sector stands in the Lao PDR economy. Therefore, this study is designed to fill these gaps by estimating the economic contributions of tourism to

the Lao PDR economy for two calendar years, one, in 2003, particularly before the development of the economic corridors and one in 2008 after its completion.

1.7 Research questions and objectives

The main research question of this study is: What is the role of tourism in the Lao PDR economy? The specific research questions are:

1. What are the international visitors' behaviour and expenditure patterns?
2. How has the tourism sector contributed to output, income, employment, valued added and imports to the Lao PDR economy?
3. What are the direct, indirect and induced effects of tourism in the Lao PDR economy?
4. What are the backward and forward linkages of the tourism sector with other economic sectors?
5. Is the tourism sector a key sector of the Lao PDR economy?
6. What are the perceptions of tourism stakeholders of the impacts and management of the tourism sector in the Lao PDR economy?
7. What are the problems and obstacles confronting the Lao PDR tourism sector?

This study empirically examines the economic impacts and contributions of the tourism sector on the Lao PDR economy. The specific objectives are to:

1. estimate the economic multipliers and total economic impacts of the tourism sector in the Lao PDR economy.
2. assess the inter-industry linkages and interdependency of the tourism sector with other economic sectors in the Lao PDR economy.
3. analyze the spending behaviour of international visitors and stakeholders' perceptions of the impact and management of the tourism sector in the Lao PDR.

1.8 Contribution of the study

This study will provide a quantifiable estimation of the economic contribution of the tourism sector to the Lao PDR economy. The outcomes of the study can be applied in investment and business operational decisions of the country's tourism sector. The indicators such as purpose of travel, length of stay, visitors' expenditure, markets, popular tourist destinations, problems and obstacles of the tourism sector identified in this study will be helpful to systematically plan the tourism activities and facilitate policy decisions in the country. The outcomes will provide the information needed in key marketing decisions and in formulating the next five-year plan of the tourism sector, which will significantly impact all tourism stakeholders.

The findings will be useful to the Lao PDR economy to adjust the production structure of the tourism-related businesses to meet future tourism demands in the country. With identification of tourism's inter-industry linkage strengths to the different economic sectors, other economic sectors can be better informed of their needs, opportunities, and so avoid possible supply bottlenecks in the economy. The study also updates the database of the Lao PDR national accounts. One important contribution of this study is the construction of two Lao PDR I-O tables which includes the tourism sector (2003 and 2008). This provides a good starting point to study the relationships between the tourism sector with other economic sectors in the country. The multiple methods used in this study such as multipliers and inter-industry linkages for identifying key sectors of the economy as well as stakeholders' perceptions on the impacts of tourism contribute literally and theoretically to tourism impact studies. Further, this study can be adopted to estimate tourism contribution in other similar developing countries as the Lao PDR.

1.9 Outline of the thesis

The thesis is organized as follows: Chapter 2 reviews the relevant literature on the economic impact of the tourism sector using various econometric models in different economies. Chapter 3 describes the data collection and methodology used in the study. Chapter 4 discusses the results of the 2003 Lao PDR I-O table and 2008 updated I-O table to derive the economic multipliers and total economic impacts of the tourism sector in the country. Chapter 5 presents the inter-industry linkage analysis, tourism sector's interdependency with different economic sectors and key sector identification in Lao PDR economy. Chapter 6 discusses tourism stakeholders' perceptions of the tourism's impacts and of management in the Lao PDR. Finally, Chapter 7 discusses the summary of the main findings, conclusions and policy implications followed by the limitations of this study and possible areas for future research.

Chapter 2
Literature Review

This chapter reviews the literature on the theoretical approaches and practical applications of tourism economic impact estimation. Section 1 presents an overview of different approaches to estimate economic impacts. Section 2 reviews the development of I-O models in the GMS economies followed by an overview of the economic impacts of tourism in different economies in Section 3. Section 4 presents a brief history and development of I-O models. Section 5 discusses different methods in updating I-O tables, economic multipliers and total economic impacts of the tourism sector. Section 6 discusses the inter-industry linkages and key sector identification of an economy. The final section summarises the chapter.

2.1 Different approaches to estimate the economic impacts

The main challenges in measuring tourism's contribution to an economy are that most countries lack the data and information, and that tourism does not exist as a distinct sector in any system of national accounts (Ennew, 2003, p.9). Thus, an analysis of the economic impact of tourism varies according to which accounting system is used. There are various approaches to estimate the economic impact of tourism on an economy. Researchers have advocated economic multipliers, partial equilibrium and general equilibrium models for tourism impact analysis of an economy. This includes the Money Generation Model; Economic Base Model; I-O model with economic multipliers, Tourism Satellite Account; and Computable General Equilibrium Model. Some of these models are briefly discussed below.

2.1.1 Economic Base Model

Using the economic base model Archer and Owen (1972), in Wales, Gartner and Holecek (1983), in Detroit, and Gunderson and Kreag (1991), in Minnesota, estimated the economic impact of tourism. The authors estimated the ratio of total income effects to visitors' expenditure and suggested a range of multipliers rather than one value. The economic base model can be formulated algebraically and is very similar to macroeconomic models. The employment multiplier is analogous to the Keynesian multiplier in macroeconomic models (Garter & Holecek, 1983). The model provides only a range of the multipliers' values not the exact figure of the multipliers and does not estimate the inter-industry linkages of an economy.

2.1.2 Tourism Satellite Accounts and Computable General Equilibrium Model

The Tourism Satellite Accounts (TSA) method is gaining attention among those concerned with measuring the contribution of tourism to national economies because it links to the existing System of National Accounts (SNA). As Smith (1997) pointed out, the term "satellite" refers to the fact that the TSA is developed as an extension, or satellite, of the I-O framework of the SNA. Thailand and China are the only countries in the GMS that follow the TSA guidelines for national accounts to estimate the tourism contribution in their countries' economy. Lao PDR has not developed the TSA and the country's national accounts are developed in line with I-O analysis. A complete TSA contains detailed production accounts of the tourism industry and their linkages to other industries, employment, capital formation and additional non-monetary information on tourism (Varlack, 2009). TSA model is not used in this study because Lao PDR does not follow the UNWTO guidelines for constructing satellite account. Therefore, limited data availability precludes the use of TSA method to assess the impact of tourism in Lao PDR.

There have been some developments in Lao PDR to follow and upgrade their tourism statistics in line with UNWTO recommended satellite accounts. The UNWTO organized a workshop on "Developing National Systems of Tourism Statistics: Challenges and Good Practices" in Laos, 16-19 June 2009, for building statistical capacity in the low income countries of South-East Asia (UNWTO, 2009). The workshop recommendations include:

- strengthen collaboration between the national statistical office, national tourism authority and central bank to establish and to ensure the quality of data;
- improve the legal and institutional framework for tourism statistics; and
- establish a regular programme of official statistical surveys for collecting good quality data for tourism statistics and making a strong case for their funding.

The application of the Computable General Equilibrium (CGE) and Social Accounting Matrix (SAM) models for the estimation of tourism's impact will also be restricted with the lack of in-depth data of economic sectors in Lao PDR required for these models. In the Lao PDR, the CGE and SAM models could have been used for wider results but their computational complexity and extensive primary data requirements such as household surveys, consumption surveys, business/enterprise surveys, and institutional surveys for the study, made it difficult to estimate tourism's economic impact in Lao PDR using these models.

2.1.3 Partial Equilibrium Models

Partial equilibrium models in this research include the economic multiplier and I-O analyses. Economic multipliers provide a measure of the degree of interdependence between industries, for example, the interdependence between the tourism sector and different sectors in an economy. Leitch and Leistritz (1985 cited in Lin & De Guzman, 2007) revealed that the standard economic multiplier approach is the simplest and least expensive way to calculate the economic impact of tourism. The I-O model provides a statistically consistent and systematic approach to understanding the economic impact of tourism on the whole economy.

The use of the I-O model to estimate the economic impact of tourism has become increasingly popular because of its ability to provide accurate, detailed information. Wall and Mathieson (2007) reported that many economists traditionally used I-O analysis to examine the impact of tourism on the economy of regions but methods including economic multiplier analysis give additional advantages to the results. Similarly, Loomis and Walsh (1997) found that the major strength of I-O analysis is that it provides detailed information on direct, indirect and induced effects of visitors' expenditure on all economic measures for different industries in the economy. Fletcher (1989) also asserted that the I-O model is particularly valuable for the measurement of second and further round economic effects of tourism. The chief value of I-O analysis is its descriptive analytical power (Bendavid-val, 1991).

The CGE models require extensive primary data such as household consumption survey, institutional survey, expenditure survey, business survey which our study could not afford given time and budgetary constraints. At the same time, since 1997, Lao PDR adopted the I-O tables while updating its annual national accounts. I-O models provide direct, indirect and induced impacts as well as inter-industry linkages, which could generate both primary and secondary impacts of tourism in the economy. Lao PDR national account does not recognize tourism as a distinct sector. The I-O tables of the latter years can be updated using I-O coefficients from previous year. Similarly, an economic sector can be disaggregated from the rest of the economy using the I-O table. Therefore, I-O models are the best method used in our research to estimate the economic impacts of tourism in the Lao PDR economy.

2.2 Development of I-O models in the GMS economies

Asra, Secretario and Suan (2006) used mixed I-O models to analyse the 20 economic sectors in Lao PDR. Food, beverage and tobacco manufacturing yielded the highest output multipliers of 1.91; the average multiplier of all sectors was 1.48. The food and manufacturing industry and livestock and poultry exhibited higher impact on the national economy output.

Sim, Secretario and Suan (2007) used a mixed I-O model for Lao PDR (Savannakhet) and Thailand (Mukdaharn). The authors' results showed that the trade value of these regions with the rest of the world was much higher than the trade between them. Industries in the service sectors generally had higher value added multipliers than industries in manufacturing sectors.

Saito and Kobayashi (2007) used multi-regional I-O and SAM in the GMS countries, Lao PDR, Thailand, Vietnam and Cambodia to estimate economic multipliers. The authors' results showed that the all industrial sectors' multipliers were distributed in the range of 1.37 to 2.47. The authors further revealed that the agriculture sector I-O multipliers are smaller than the industry and service sectors due to the inter-industry structure of the commodity flow.

2.3 An overview of tourism economic impacts in different economies

The United Nations World Tourism Organization (1994) stated that tourism's economic impact on an economy is initiated by visitors' expenditure, "the total consumption expenditure made by a visitor for and during his/her trip and stay at the destination". Taylor, Fletcher and Clabaugh (1993) claimed that visitors' expenditure is a key variable in the economic analysis of the costs and benefits associated with the travel and tourism industry. Similarly, Alberta Economic Development (2000) reported that economic impact analysis is used to determine the effect of visitors' expenditure primarily on employment, value added, income and government tax revenues in an economy. It is based on the premise that initial or direct effects alone are poor measures of the total impact of tourism on the economy.

Tourism economic impact analysis estimates the changes in final demand created by international visitors within the region in a specific time. Visitors' expenditure makes an economic impact on an economy that is called the direct effect. Spending money on economic activities creates values such as sales, income and employment in that economy. Mazumder, Ahmed and Al-Amin (2009) reported that the spending also has indirect impacts as well as induced impacts that are associated with the primary effects. The cumulative effect estimation is called the total economic impact in the economy. Mazumder et al. (2009) further reported that tourism economic impact assessment is computed by estimating visitors' expenditure and then applying an economic model to trace the effects of the expenditure in an economy. Economic multipliers capture the impacts of a given change in final demand on sales, income and jobs for the primary and secondary effects in the economy (Stynes, 1997).

Surugiu, Frent and Surugiu (2009) explained that tourism is not the only creator of GDP but has an important contribution to value added and acts as a factor that stimulates the global economy. Tourism is becoming an important sector in achieving rapid economic growth in an economy creating income, employment, earning foreign exchange and reducing the balance of payments of a country. Similarly, Harcombe (1999) found that tourism benefits include the effects of price and income elasticity and the economic consequences of visitors' expenditure including foreign exchange. Price is a complex factor in international tourism. From an economic perspective, the demand for a tourism product is a function of both the price and income. For example, an increase in real income provides consumers with greater spending power. The author reported that tourism provides a significant number of beneficial economic impacts on any country that receives a steady flow of visitors. The visitors' expenditure produces cascading effects through the economy via the multiplier effects in which enterprises are stimulated and jobs created, which together contribute to increased revenue for the community, the private sector and the government. Ennew (2003) reported that the true impact of tourism is not the visitors' actual expenditure but the final impact that this expenditure has on the economy. Therefore, the visitors' initial expenditure can have significant additional impacts throughout the economy.

Brau, Lanza and Pigliaru (2003) analysed cross country studies from a sample of 143 countries and found that those countries with a higher ratio of tourism receipts to GDP performed significantly better than those countries with lower ratios of tourism receipts to GDP. Durbarry (2004) found evidence of a positive impact of tourism on long-run economic growth in Mauritius. Similarly, Kim, Chen and Jang (2006) also revealed that tourism and economic growth seem to reinforce each other.

The discussion of the positive and negative economic impact of tourism covers a range of direct, indirect and induced effects, as well as leakages, and has emerged over time (Fletcher, 1989). Wall and Mathieson (2007) revealed that tourism contributes significantly to the GDP, balance of payments and employment in developing countries but the sector receives less attention with regard to research and development.

2.3.1 Tourism's impact in the GMS countries

Osterhaven and Fan (2006) used a 1997 I-O table to estimate the impact of international tourism on the Chinese economy. The authors used tourists' expenditure data in 1992 with an I-O model. The results revealed that 1.6 percent of GDP, 1.4 percent of household income and 1.1 percent of employment was provided in the country's economy by international tourism.

The impact of international tourism on household income was only half of the impact on GDP, that is 60 out of 120 billion Yuan. The research revealed that, in view of the large size of the agriculture and manufacturing sectors, tourism's impact share was small in China.

Yan and Wall (2001) claimed that tourism has limited impact due to the size and diversity of the Chinese economy. However, Oosterhaven and Fan (2006) reported that the secondary impacts of both domestic and foreign tourism on the Chinese economy amounted to US$152b in 2003 and US$54m domestic employment in 2004. Pao (2005) reviewed the economic impact of tourism in Macao. Pao reported that the average growth in tourism receipts had been double that of Macao's GDP during 1995-2004.

China is becoming a major tourist destination in the world and a major 'international tourism player' (Wen and Tisdell, 2001). Since its economic reforms in 1980s, the country has progressed from being an insignificant world international tourist destination in terms of visitor arrivals and receipts to being one of the top ten tourist nations. The UNWTO (1999) revealed that in 1999, China (excluding Hong Kong, Macau and Taiwan) ranked fifth in the world in terms of international tourism receipts. Wen and Tisdell (2001) also reported that the tourism sector exhibited high economic multipliers, high interdependencies and strong inter-industry linkage effects on the economy of Yunnan Province. According to UNWTO, China emphasis was on the expansion of inbound tourists as a vehicle for its economic growth but subsequently attention was also given to the expansion of domestic tourism. On the other hand, the regional distribution of tourism in China is extremely uneven. Therefore, UNWTO recommended that it is becoming increasingly important for China to develop its tourist destinations in all regions and improve its tourist products to compete with other popular destinations within the country. For example, the development of ecotourism may stimulate further and balance the growth of tourism throughout the country.

Trinh, Secretario, Kim and Hung (2005) use mixed I-O models to empirically compare the economies between Ho Chi Minh City (as a region) and the rest of Vietnam (national level). The authors reported that the use of national coefficients as initial approximations of regional input structures tends to overstate the total output multipliers. This is based on the assumption that actual regional data used in the mixed approach are reliable. The study further revealed that the building of detailed I-O structures is constrained by the limited scope and coverage of the ad hoc national I-O survey. The method was based on a small purposive sample survey which underscored the need to improve the sampling design and spatial coverage of the

survey. The study suggested future research in inter-temporal analysis and timely updating of regional I-O tables should be carried out.

Chheang (2009) reported that Cambodian tourism receipts were US$820m (9% of the GDP) in 2008 and were projected a rise to US$1,706m by 2018. The study revealed that the tourism sector provided 15 percent of the total employment in the country, which was the second largest income contributor to the country's economy after the garment industry.

Wattanakuljarus (2005) reported that over half of Thai industries are interdependent with tourism. The study found that tourism increased imports of intermediate inputs in the manufacturing sector but stimulated the real GDP of the Thai economy. The study further revealed that tourism benefited all household classes in consumption, utility and income.

The United Nations (2007) reported that in light of the continuing growth expected for the Lao PDR's tourism industry in the foreseeable future, it can be assumed that the share of tourism in the economy will become more significant. Suntikul, Bauer and Song (2009) found that in 2005 the number of jobs directly related to tourism was estimated to be about 18,000 in Lao PDR. The study revealed that 31 percent of the cost of producing tourism goods and services in the country in 2005 was represented by leakage through imports.

2.3.2 Summary of selected economic impact studies of tourism in different economies

Table 2.1 shows the major research outcomes using I-O models in tourism impact analysis in different economies.

Table 2.1 Summary of the main research findings on the impact of tourism using Input-Output analysis.

Researcher(s)	Economy	I-O analyses used	Main findings
Liu and Var (1983)	Victoria, Australia	I-O with economic multipliers	Computed economic multipliers for tourism impacts using an I-O model. A relatively low income multiplier, 0.65, was derived revealing high imports. Overnight visitors had a greater multiplier impact on income; day visitors had a higher multiplier impact on employment.
Heng and Low (1990)	Singapore	I-O multipliers by visitor point of origin	Tourists' expenditure impact is quite uniform regardless of the tourist's country of origin and purpose of visit. Results show that tourism output multipliers are larger than those for manufacturing and export sectors and employment multipliers are relatively high.
Archer (1995)	Bermuda	Standard I-O for three different years	Tourism has major employment impact. Income multiplier increasing over time due to efforts to increase the value added in outputs. The author concluded that the level of employment depended heavily on tourism although the leading generator of foreign exchange earnings and income since the early 1990s was international business and finance.
Archer and Fletcher (1996)	Seychelles Island	I-O and multipliers by visitor point of origin of 1991 data	Estimated the impacts made by tourism expenditure on income, employment, government revenue and the balance of payment in Seychelles. Tourism contributes approximately 24 percent to GDP and impacts, which vary by visitor county of origin and higher spending tourists have a greater economic impact. The average expenditure of visitors from Germany was Rs7,567, Italy Rs6,414, Switzerland Rs6,891, and UK and Eire Rs6,093 per visit. The authors concluded that, in order to maximize the impact of tourism on incomes, employment and government revenue, Seychelles should concentrate on increasing the number of high spending visitors from long-haul countries.
Henry and Deane (1997)	Ireland	I-O (direct, indirect and induced effects)	Estimated economic impact of visitors' expenditure measuring GDP, employment, government revenue and balance of payments for 1990 and 1995 I-O tables. Tourism accounts for 7 to 11 percent of national aggregates and the sector shows a higher GNP impact than the aggregate exports of goods and services.
Frechtling and Horvath (1999)	Washington D.C.	Regional I-O (ratio and normal multipliers)	Estimated multipliers effect of visitors' expenditure in Washington D. C. comparing the multipliers of 37 sectors showed that the tourism sector ranks relatively high in output and income generated. The authors revealed the value of output multipliers of 1.35, income multiplier 0.35 and 17.59 jobs per US$1m for employment multipliers. Ratio multipliers were found to be more reliable than normal multipliers of total impact on income and employment.
Parlett, Fletcher and Cooper (1995)	Old Town of Edinburgh	Standard I-O (direct, indirect and induced effects)	Economic impact figures do not fully reflect the importance of the Old Town of Edinburgh as a tourist destination. Though tourists visit the Old Town, much of their spending occurs outside this area and their multiplier figures are extremely low.
Wagner (1997)	Guaraqueca ba, Brazil	Standard I-O (direct, indirect and induced effects) and SAM	Tourism has a low impact on the economy due to the high import content. The greatest economic impacts are associated with rural farmers and subsistence households. Results further revealed that there are relatively weak linkages to other non-tourism sectors.

Researcher(s)	Economy	I-O analyses used	Main findings
Liu, Var and Timur (1984)	Turkey	I-O model with multipliers	High value ratio multipliers demonstrate the importance of indirect and induced effects of tourism sector in the economy. The results indicate that visitors who spent more on retail purchases and less on hotel and restaurants had a greater propensity to generate more direct and indirect income. International visitors' expenditure overnight stay in the country had the highest output multipliers indicating that they required more goods and services per visitor dollar spent and hence generated more economic activity than did domestic tourists and day excursionists. The international visitor expenditures are divided into two categories, overnight stay and day excursionists in the research. The authors further revealed that the tourism sector contributed a total of US$470m with US$227m direct, US$146m indirect and US$58m as induced impacts on the country's economy.
Zhou, Yanagida, Chakravorty and Leung (1997)	Hawaii	Standard I-O model	Compared two impact assessment approaches (I-O and CGE) on the Hawaii economy from a reduction in visitors' expenditure. The results of the I-O model were similar in magnitude to those of the CGE model but generally higher and tourism related sectors exhibit the larger economic effects from the I-O model.
University of Vermont (1999)	Vermont, USA	I-O models	About 4.62 million visitors made 15.7 million person trips to Vermont with direct visitors' expenditure of about US$2.2b. Incorporating direct, indirect and induced impacts of tourism, visitors' expenditure made a US$3.7b total economic impact on the economy. The total economic impact (direct, indirect and induced) of the visitors' expenditure was 15 percent of the gross state product. The study further revealed that tourist activities generated 23 percent of total state employment and 24 percent of indirect business taxes were related directly and indirectly to visitors' expenditure. For every million dollars spent by the visitors, 38 jobs were created and for every dollar spent by the visitors an additional 69 cents of expenditure were generated. Compared with other sectors in the state, tourism had a high ability to generate employment, income and taxes for the state economy.
Tohamy and Swincoe (2000)	Egypt	Economic impact assessment method	Results indicated that the impact of tourism on GDP was about 4.4 percent compared to the national statistics' estimate of one percent. For employment, visitors' expenditure directly supplied 1.2 million jobs and indirectly 2.7 million jobs in various economic sectors in the country. Tourism contributed around US$3.6b, which is about five percent of the total taxes generated by the government in the country. For example, in regards to the employment multiplier, US$1m of visitors' expenditure created 329 jobs compared with 13 jobs in oil extraction, 183 jobs in construction or 192 jobs in the garment industry. Tourism's ability to contribute significantly to the economy earned the sector a higher rank in the country's policy. Tourism ranked third among the seven key sectors (readymade garments, oil

Researcher(s)	Economy	I-O analyses used	Main findings
			extraction, agriculture, financial institutions, food production and construction and buildings) out of 32 sectors in the Egyptian economy.
Mistilis and Dwyer (1999)	Victoria, Australia	I-O for MICE tourism	In MICE tourism, both gross direct visitors' expenditure together with its multiplier effects and employment impact were higher for gateway than for non-gateway visitors.
West and Gamage (2001)	Australia	Standard I-O model	If substitution expenditure effects by residents are taken into account, then interstate tourism contributed the greatest amount of output and employment followed by international visitors.
Arabsheibani and Delgado-Aparicio (2002)	Peru	I-O model with multipliers	The tourism sector multiplier is relatively significant prompting the ability to create income and boost production. Overall, the service sectors contributed more than the manufacturing sectors through their direct impacts in the Peruvian economy. In 1988, for every US$1m of visitors' expenditure, 276 jobs were created, of which 68 were direct jobs, 25 were indirect jobs and 183 induced jobs. Similarly, in 1988, a total of US$982m was contributed by the visitors' expenditure of which international visitors contributed US$448m and domestic visitors US$534m. The calculated multipliers suggested that the Peruvian government should invest more in railways and road transport services (3.65), car hire services (2.74) and restaurants (2.32) rather than air services because these sectors had higher income generation from the visitors' expenditure in the country.
Abeysinghe and Meng (2002)	Singapore	I-O model with visitors' expenditure	In 2001, the average length of stay of a tourist in Singapore had been about three to four days and average expenditure per visitor had also fallen over time. Results suggested that instead of eight million visitors who stay three days, six million visitors who stay four days would be a more desirable outcome from the country's tourism sector. The authors concluded that considerable attention should be given to strategies that could extend the length of visitors' stay and increase visitors' expenditure in the country.
Sun (2005)	Taiwan	I-O model	Demonstrated the tourism impact on Taiwan based on the economic contribution by the market segment. The results indicate that high spenders contributed two to three times more expenses than low spenders in 2000-2001. Visitors from North America, Japan, Singapore and Malaysia were the top four tourist groups in terms of per person per trip expenditure in Taiwan. The research concluded that the multiple indicators such as length of stay, segment shares, and daily spending by individual visitor segments, should be concurrently incorporated in policy formulation and the evaluation process in the tourism sector in Taiwan.
Chhabra, Sills and Cubbage (2003)	North Carolina	Standard I-O and multipliers	Estimated the economic impact of visitors' expenditure on food, lodging, festival vendors and sponsors benefit from substantial expenditure. The multipliers are relatively small and hence the total economic impacts of festivals represent only a small percentage of economic activity.
Lee and Taylor (2005)	South Korea	Standard I-O model	Using an I-O model on tourism's economic impact of the 2002 FIFA World Cup Football event, the authors found that the foreign world cup tourists provided a much higher value than

Researcher(s)	Economy	I-O analyses used	Main findings
			foreign leisure tourists, spending an estimated 1.8 times as much.
Freeman and Felsenstein (2007)	Israel	Multi-regional I-O model	Used an I-O model of hotel industry outputs for four classes (grades) of hotels in six regions of Israel. The national level multiplier effects of the tourism sector with which it trades (land and air transportation, car rental, restaurants, catering, etc.) are of equal magnitude. The tourism sector multiplier is 3.56; the hotel sector's output multiplier was about 3.80.
Surugiu et al. (2009)	Romania	I-O model with multipliers for 2000 and 2005 data	The employment multiplier for hotel and restaurant sector showed the sector ranked ninth in 2000 and ranked fifth in 2005, in the economy. For tourism output, a change of one Ron in the demand for hotels, restaurants and travel agencies resulted in a change in the economy's total output of 2.44 Ron, placing tourism 11th out of the 19 sectors in the study. The authors calculated €877m gross tourism receipts for Romania in 2005 and projected the sector to increase its receipts to €1,726m in 2011 and €7,740m in 2021. Hotel, restaurant and travel agencies contributed 2.3 percent to national output and tourism employment contributed 1.4 percent of total employment. Similarly, the tourism sector contributes around 12 percent of the total exports in 2005, a significant increase compared to two percent in 2000.
Mazumder et al. (2009)	Malaysia	Standard I-O and multipliers analysis	International visitors' expenditure made the highest contribution in generating output in the Malaysian economy. The lower value of the import multiplier indicates that the amount of imports/leakage as a result of visitors' expenditure was insignificant. The research showed relatively high Type I (6.26) and Type II (6.56) multipliers, which indicated relatively strong linkages with different economic sectors, reflecting the significance of the secondary impacts of tourism. The employment multiplier was estimated to be about 0.74. The authors found relatively low Type I multiplier (1.24 and 1.32) for income and employment for 2000 and Type II (1.29 and 1.39) multipliers for income and employment for 2005. The study concluded that tourism contributed significantly to the Malaysian economy.
Albqami (2004)	Saudi Arabia	1997 I-O multipliers	The I-O model disaggregated the tourism sector from different economic sectors and measured the effects of visitors' expenditure on sector output, employment and income. The tourism sector accounted for about five percent of gross output in the 2000 visitor's expenditure survey. The results showed that the trade and transport sectors had higher absolute amounts of direct and indirect outputs. Through these impacts from visitors' expenditure the tourism sector received an estimated income of SR8,690 million. The service sector generated most benefits from the visitors' expenditure with about 33 percent of the total income generated from tourism activities associated with the service sectors.
Kweka, Morrissey and Blake (2003)	Tanzania	I-O models from 1992 data	Estimated the economic impact of tourism and assessed its contribution to the Tanzanian economy. Tourism had a significant impact on output and income and contributed to tax revenue and foreign exchange earnings in the country. The total visitors' expenditure was

Researcher(s)	Economy	I-O analyses used	Main findings
			US$120m in direct tourism net foreign exchange earnings. The indirect and induced impacts from tourism were estimated to be US$102m and US$95m, respectively. The total impact associated with tourism was equivalent to 5.8 percent of GDP and the employment was equivalent to 1.6 percent of the total labour force. The study estimated the tourism output multiplier was 1.84 and income multiplier was 0.69 and concluded that the tourism sector made a significant contribution to the economy.
Saeter (1998)	Norway	I-O models	Used an I-O model and a survey of visitors' expenditure to model the impact of tourism on the town of Roeros. Tourism contributed 10 percent of the total employment in the town. The author concluded that planners and politicians overemphasized the indirect economic impact of tourism in discussing the role of tourism in regional and rural development.
Tantirigama and Taniguchi-Singh (2009)	New Zealand	I-O multiplier approach in 2005	The results indicated that the multiplier coefficients for all tourism industries in the country added together were 2.15 and 4.56 for Type I and Type II multipliers, respectively. The higher value multipliers indicated that the tourism sector made a significant contribution to the economy and the sector was well interlinked with the local production systems. The contribution of the tourism and transport sectors to GDP was 10 percent and the employment share from these two industries was 12 percent; tourism alone contributed five percent of GDP.
Ruiz (1985)	Puerto Rico	I-O model of 1980 data	The results showed that visitors' expenditure totalled US$344m, which generated US$429m in the GDP and US$716m in total output in the economy. The food and beverages and manufacturing sectors received significant benefits from the visitors' expenditure and tourism related activities. In terms of employment, the tourism sector generated 48,926 jobs, of which 34 percent were in the commerce sector, 16 percent in hotels, seven percent in the manufacturing sector and 18 percent in amusement and recreation, creating 142 jobs for every US$1m of visitors' expenditure. The hotel sector alone produced US$131m of output. The author concluded that although tourism only accounted for about five percent of the country's GDP, the sector was important in terms of linkages to different sectors and contributed significantly to employment creation in the country.
Eriksen and Ahmt (1999)	Denmark	Multiregional I-O models	Examined the economic impact of international tourism for all 16 regions of Denmark. The results showed that tourism's share of economic activity varied considerably in the regions. The study showed the revenue from foreign tourists was US$4.6b, which was about 23 percent higher than US$3.7b reported by Statistics Denmark.

2.4 History and development of I-O models for economic impact analysis

The I-O model was first developed in the late 1930s by Wassily Leontief who received the Nobel Prize in Economics in 1973 for his contribution to economics. The modern version of the I-O model produced in 1953 by Leontief, also called the dynamic I-O model, and contains an equal number of rows and columns. The model is based on a system of linear equations that represent the distribution of an industry's product throughout the economy. The state-of-the-art in I-O methods has been regularly discussed and updated worldwide through research and conferences. Further development of national and regional I-O models made much progress in the 1950s, 1970s and, recently, by different economists.

Rasmussen (1956), Hirschman (1958) and Chenery and Watanabe (1958) pioneered the development of backward and forward linkage indices using I-O models. This approach was later used to identify the key sectors in the economy. Guilhoto and Filho (2005, p.143) criticized the linkage indices developed by Rasmussen-Hirschman and Chenery-Watanabe in that they do not take into consideration the different levels of production in each sector of the economy that are addressed by the pure and weighted linkages and I-O Multiplier Product Matrix approaches developed during the late 1980s and 1990s.

Stone (1970) extended Leontief's work on the I-O model to the analysis of demographic structures that are devoted to accounting and data processing, addressing interregional analysis, stability of I-O coefficients and forecasting methods. Stone also discussed reflectors of consistent forecasting in multi-sector models and the I-O table and coefficients projections. Miller and Blair (1985) considered another comprehensive contributor to I-O modelling. The authors expanded the theoretical foundation of I-O, multiregional I-O economic multiplier estimation, the temporal stability of I-O coefficients and updating methods for I-O coefficients and tables. They also developed methods to measure the direct and indirect impacts of a change in the final demand over output, income and jobs using I-O models.

Fletcher (1985) looked at the practical applications of I-O analysis and drew some examples of tourism based I-O models to demonstrate the flexibility of renewed developments and suggested modifications to the methodologies. Fletcher, Baum and Mudambi (1989) examined the various models that can be used to estimate the economic impact of visitors' expenditure and found that I-O models were the most comprehensive model that could be used. The authors were sure that the versatility of the I-O method allows the model to be expanded and used to examine the impacts of a sector on the economy.

During and Schnabl (2000) and Leoncini, Maggioni and Montresor (1996) followed Cuello, Mansouri and Hewings' (1992) work on weighted linkages and proposed the estimation of weighted linkages in the I-O model to obtain a more accurate measure of the economy-wide importance of key sectors. The weighted linkage concept uses the relative importance of final demand and total sector output as weights while estimating the inter-industry linkages.

Stynes (1997, 1999) extended the tourism economic impacts analysis methods to examine the impact of visitors' expenditure. The author developed the estimation of the key money generating model variables such as spending averages, economic multipliers, income and employment ratios using expenditure surveys and secondary data from government economic statistics to generate the economic impact of the tourism sector.

Dietzenbacher and Hoen (1998) discussed the theory and application of I-O model, including multiplier analysis, modelling and extended I-O models. The authors discussed taking into account demand for labour, generation of income, consumers' expenditure and the structural analysis of I-O models. Dietzenbacher (2001) described the row sum of the output $(I-B)^{-1}$ inverse and column sum of the input $(I-A)^{-1}$ inverse as inter-industry linkages of an economy. The row sum of output $(I-B)^{-1}$ inverse is also called the Ghosh inverse, which measures direct plus indirect forward linkages. The column sum of the inputs $(I-A)^{-1}$ inverse, also termed output multipliers, measures the direct plus indirect backward linkages of an economy.

Sonis, Guilhoto, Hewings and Martins (1995) and Sonis, Hewings and Guo (2000) developed the economic linkages, key sector identification and structural changes using the de-composition (disaggregation) approach of an economic sector. The authors proposed pure and weighted linkages to measure the importance of sectors in terms of production scale in the economy. The authors mentioned that key sector and inter-industry linkages analyses using the allocation of changes in output between two time periods can also be ascribed to changes in coefficients and changes in the final demand of an economic sector in the economy. Cai and Leung (2005) worked on alternative methods of inter-industry linkages analysis using an I-O model based on the re-composition (aggregation) approach but supported the interpretation of these developed by Sonis et al. (1995; 2000), which appeared practical and logical in estimating linkage indices of economic sectors.

The recent influential literature on I-O analysis are Miller and Blair (2009), Blake (2005), Ten Raa (2005), Mazumder et al. (2009; 2011), and Kurz, Dietzenbacher and Lager (1998). Mazumder et al. (2009) examined the contribution to the Malaysian economy made by the

tourism sector through deriving multipliers using an I-O model. The authors computed normal and ratio multipliers and tourism sector linkages with other economic sectors in the economy.

2.4.1 Input Output analysis of the Lao PDR economy

Asra, Secretario and Suan (2006) revealed that Lao PDR made an initial attempt to compile the 1997 national I-O table. However, due to the unreliability of the data, Lao National Statistics withheld the publications. Since then, Lao PDR has annually produced its national accounts in line with I-O tables. The first I-O table was published in 2003 with the help of the ADB. Based on the I-O table, Saito and Kobayashi (2007), Sim, Secretario and Suan (2007) and Asra et al. (2006) examined the economic structure of the Lao PDR economy.

Asra et al. (2006) measured the total impact of final demand on production, employment, income and imports for 20 economic sectors including 10 aggregated sectors of Savanakhet, Lao PDR. The tourism sector was scattered in all related sectors in the I-O table. The study showed food, beverages and tobacco manufacturing demonstrated the highest output multiplier and suggested that the sector has the greatest impact on the output of the economy among all economic sectors considered.

Asra et al.'s (2006) results also showed an assessment of product outflows and inflows based on I-O table 2003 data where the total imports reached US$167m and exports amounted to only US$84m resulting in negative terms of trade of US$83m (33%). Similarly, the service sector also recorded negative terms of trade amounting to US$12m caused by the sizable negative trade balance in the transportation sector. The authors concluded that the movement of people and goods in Savannakhet depended on external transport operators but the sector recorded a low output of only US$1m in 2003.

Based on 2003 data, Sim et al. (2007) measured the extent of economic linkages between Thailand and Lao PDR by constructing interregional I-O tables that linked the cross border economies of Mukdaharn (Thailand) and Savannakhet (Lao PDR). The authors used primary data to develop the Savannakhet I-O table but indirect methods with secondary data were used to construct the Mukdaharn I-O table. Interregional I-O analysis showed the Mukdaharn economy had a higher per capita Gross Provincial Product than Savannakhet. The Gross Value Added in Savannakhet spread evenly across agricultural industries. The results also showed that agriculture and forestry in Savannakhet and manufacturing industries in both provinces had greater forward and backward linkages than other sectors. In these studies, the tourism sector was not a distinct sector in the economic impact and key sector analyses.

2.4.2 Basic structure of the Input-Output table

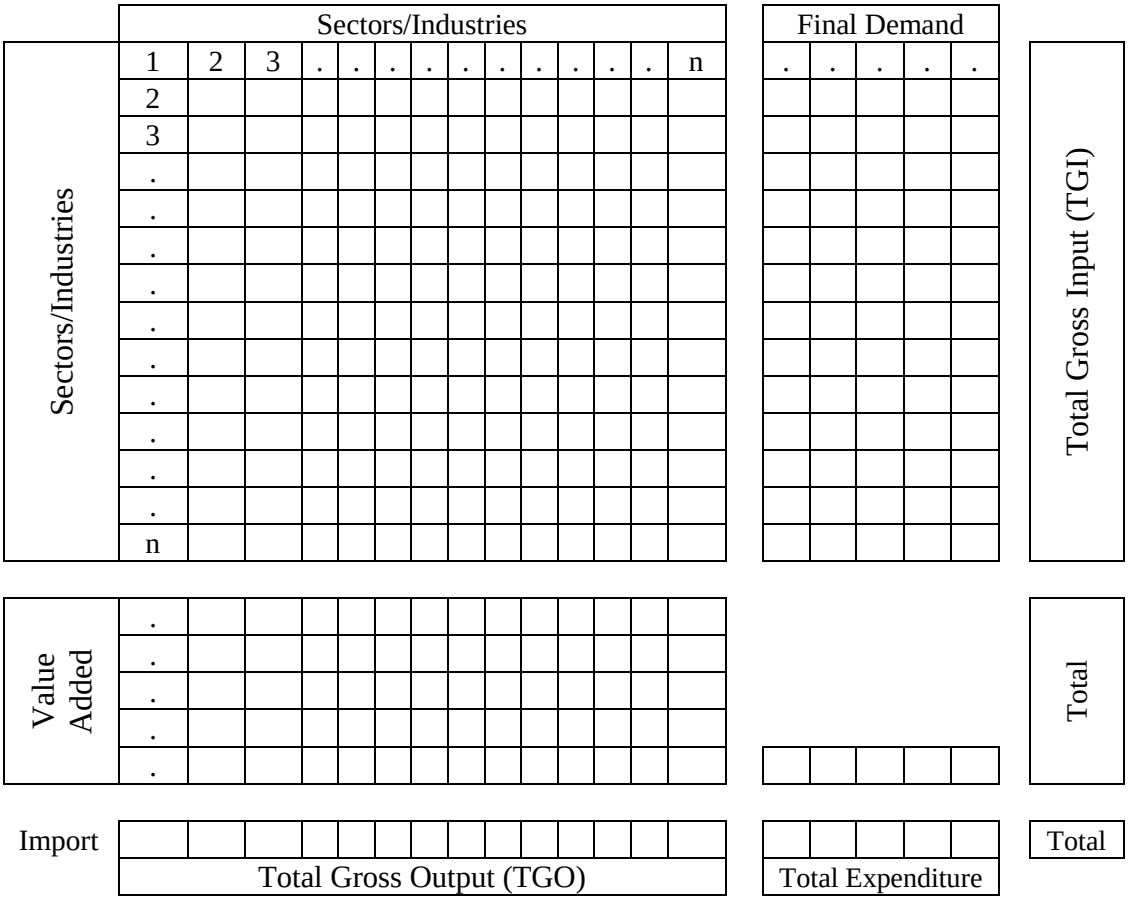
The Leontief I-O model describes the internal relationships and analysis of a specific sector's impacts on different economic sectors of a country. According to Bekhet (2010, p.108), the basic I-O table describes rows showing "Who gives to whom?" and columns showing "Who receives from whom?" in an economy. Mazumder et al. (2009) reported that I-O modelling is widely used to answer the demand side questions such as whether the final demand from one sector, say tourism, is expected to increase in future and would this affect the total output necessary to satisfy this new demand and its multiplier effects throughout the economy?

Pratt (2009, p.43) claimed that an I-O table depicts a comprehensive set of accounts of sales and purchases of goods and services among the producing sectors, final consumers (households, international visitors, export and government) and resource owners (labour, capital and land) in a year for a specific economy. Lin and De Guzman (2007) explained that an I-O model is based on the premise that the economy can be decomposed into aggregate sectors. The I-O model is therefore a tabular representation of output flows from several industries or sectors and the flows of inputs to various industries or sectors (Fatemi, n.d.).

Figure 2.1 shows the basic structure of an I-O table. The table illustrates the flows between the sales and purchases of both the intermediate and final demand of sector outputs. The blocks of intermediate and final inputs show the inputs required to produce the outputs of different sectors of an economy. The block of product and industries shows how the outputs are used to make inputs for different sectors in the economy. The final demand block shows the transactions of final users with intermediate production sectors. The value added block indicates the primary input components considered as final demand. The total input block is the column sums of all inputs needed for production including the inputs purchased from different sectors as well as the purchase of capital, land and labour (see Figure 2.1). The total output/demand block is the output produced by a particular sector to meet the internal and external demand (Devkota, 2003). The value added row totals show the compensation of employees, operating surplus, production tax and subsidies, depreciation and import taxes.

The column total in the industry sector shows the gross output or value of the product produced by that sector. The row totals for the sectors show the total demand for each product that is required to produce their outputs and it must be equal to total inputs (see Figure 2.1). The column totals of the final demand components show the total expenditures including visitors' expenditure. The final demand sector includes the value of goods and services used by government, households, gross fixed capital formation, changes in inventories and exports

(Blake, 2005). The final demand sector is known as an exogenous sector because changes in demand for the products in this sector occur autonomously and its repercussions are transmitted through the rest of economy (Jones, 1997, p.7).



Source: Adapted and modified from Blake (2005, p. 5)

Figure 2.1 Basic structure of the Input Output table.

The row entries of the I-O table describe the total sales as inputs to the column entries in the economy. The column entries in the table describe the inputs used by each sector from different sectors. Therefore, the I-O coefficients examine how production in each sector changes in response to a change in the final demand of that sector (Chang, 2001). Devkota (2003) reported that an I-O model is a transactions table that displays and measures the purchases and sales of goods and services taking place in an economy at a given point of time. In Figure 2.1, as per the double accounting system in an I-O table, the total inputs and outputs of these economic sectors must be equal (Blake, 2005). The basic equations of an I-O table include (Devkota, 2003):

$$Intermediate\ inputs + Gross\ value\ added = Total\ inputs \quad (2.1)$$

$$Intermediate\ demand + Final\ demand = Total\ outputs \quad (2.1)$$

$$Total\ inputs = Total\ outputs \quad (2.3)$$

In an economy, sector output is denoted by vector X, vector Y is the final demand in each sector. They are connected through a matrix $(I\text{-}A)^{-1}$, known as the "Leontief inverse" shown in the following equation:

$$X = (I - A)^{-1} \times Y \quad (2.4)$$

$$\Delta X = (I - A)^{-1} \quad (2.5)$$

Where:

I = identity matrix;

A = input-output coefficient matrix across sectors; and

ΔX = change in outputs

2.4.3 Advantages of the Input-Output model

Devkota (2003) reported that the I-O model is widely used in development economics. The power of an I-O model lies in its ability to trace not only the direct impacts of specific changes in an economy but also the indirect impacts. Three basic principles of the I-O model are that the demand determines the output and supply determines the inputs, which reflects the circular flow of an economy (Bon, 2000). These two demand and supply side I-O models can be used to update or estimate sector inputs and outputs of an economy. As a descriptive and analytical tool, the I-O model gives an enormous quantity of information in a precise, orderly and easily understood tool (Bendavid-val, 1991). I-O tables are an important part of the System of National Accounts (SNA), which are necessary inputs for CGE and SAM models (Nathani, Wickart, van Nieuwkoop, & Oleschak, 2006). Developed countries regularly construct I-O tables to assess the structure of their economy. For example, I-O tables' compilations are mandatory for all European Union member countries following certain specific details and standards. The United Nations (1990) outlined I-O models' advantages as follows:

i. Provides a comprehensive picture of the inter-industry structure of the economy.
ii. Reveals the interrelationship of a sector with other sectors of the economy.
iii. Provides a statistically consistent and systematic approach to understand the economic impacts of tourism in the whole economy.
iv. Enables the determination of the relative size of the tourism sector in the economy.
v. Compare the performance of the tourism sector with the different economic sectors in the areas of generating foreign exchange, income and employment.

I-O models are intended to represent an economy at a point of time, the "long term equilibrium". The United Nations (1990) described three important assumptions for I-O models as follows:

(a) technical production functions are linear;

(b) industries produce a single homogeneous commodity; and

(c) there are no supply constraints.

2.4.4 Limitations of the Input-Output model

Despite its wide economic impact application I-O models have a few limitations (Briassoulis, 1991; United Nations, 1999):

a) ***Time/data issues:*** A single year's data is used to develop the I-O table but, because of the expensive and huge data requirement, the model is widely compiled every 5-years.

b) ***Stability of the technical coefficients over time:*** An economy can have changes such as technology and demand during five years, so the coefficients in the I-O table change accordingly. This can impact the results if the coefficients are "out of date" and if the technologies are changing rapidly.

c) ***Linear relationship:*** An I-O model assumes a linear relationship between increasing demand for inputs and outputs that may not happen in long run.

d) ***Industrial categorization:*** An I-O model assumes that each economic sector has a single, homogeneous production function and produces similar types of products.

2.5 Methods for updating Input-Output tables

Yu, Hubacek, Feng and Guan (2010) reported that survey-based I-O models are expensive and time-consuming, therefore semi survey and non-survey techniques are widely applied. There are many non-survey techniques such as regional weights and aggregation techniques, location quotients, final demand method, cross entropy method and the RAS method.

2.5.1 Final Demand method

The final demand method in updating and balancing an I-O table predicts the gross outputs for future years corresponding to the respective year's final demand using the base year's inter-industry relationships (Khan, 1993). This method requires less data than other methods because it needs only the final demand for future years and predicts the whole transaction table and gross output of that particular year.

2.5.2 Cross Entropy method

The Cross Entropy (CE) method is based on the Kullback-Leibler (1951) "additional information" that measures the probability distribution of a sector with respect to others (Parra

& Wodon, 2008, p. 77). The CE method allows the estimation of a probability distribution, which generates measures of the precision of the estimates. Parra and Wodon (2008) explained that the method is considered a flexible approach but has a complex data requirement compared with the final demand and RAS methods. However, the method allows the inclusion of different types of constraints in balancing and updating I-O tables. Robinson, Cattaneo and El-said (1998) used the CE approach to describe an extension of the RAS method that assumes consistent prior I-O/SAM information to be used in estimation.

2.5.3 RAS method

The RAS method is relatively simple and uses a bi-proportional matrix leading to minimum errors while estimating and updating I-O tables (United Nations, 1999). In other words, Row (R) is called the row coefficient (substitution effects), Column (S) is called the column coefficient (fabrication effects) for the sector (updated year) and 'A' is I-O coefficient of the base year. The RAS method is widely used globally because of its simplicity and it demands fewer details of the data compared with the CE method.

$$RAS = Row\ coefficient\ 'R' \times Total\ output(input)'A' \times Column\ coefficient\ 'S' \quad (2.6)$$

Wang, Li and Cai (2003) reported that the RAS method has the broadest application because of its manoeuvrability for semi-survey I-O models. The RAS method (Stone & Leicester 1966, in Jensen, Mandeville, & Karunaratne, 1979) has received most attention in the I-O literature. Smith and Morrison (1974) applied the RAS method to estimate the regional I-O coefficients from the national table for the city of Peterborough in the UK (Smith & Morrison 1974, cited in Hewings, 1985). Kirori (1993), Toh (1998), Jakson and Murray (2004) and Xu, He and Zhao (2007) recommended RAS method to balance and update I-O tables.

Dietzenbarcher and Hoen (1998, p.117) used an I-O model in constant prices obtained by double deflation which was considered different from the RAS method. However, the first step of the RAS method yields the same estimate for the intermediate deliveries as the double deflation method provided the RAS method starts with row adjustments. Furthermore, when the correct table in constant prices satisfies the double deflation method and the value-added vector in constant prices is available, the RAS method yields the correct result. United Nations (1999) recommended the RAS method, which has been used widely in updating and balancing I-O tables. The RAS method is relatively easy in terms of balancing and updating I-O tables because it requires the row and column sums to be used as controls for an updated year and can be obtained from the national statistical data of the country.

2.6 Tourism economic multipliers

Economic multipliers measure the economic impact or effects in terms of output, household income or employment resulting from a change in the final demand within an economy (Mazumder et al., 2009). A tourism economic multiplier is a measure of the total economic impact in the country attributable to a dollar of the visitors' expenditure. The multiplier adds up various rounds of economic activity initiated by that particular visitors' expenditure (Miller & Blair, 1985, 2009). Considering the individual sector activities within the tourism sector, different sectors have varying multiplier coefficients; their abilities to generate economic activity are different (Mazumder et al., 2009).

The multiplier concept was used to measure the economic impact of tourism in an economy by Archer and Fletcher (1990) followed by Khan, Seng and Cheon (1990), Archer and Fletcher (1996), Wall and Mathieson (2007) and Mazumder et al. (2009). According to Wall and Mathieson (2007, p.109), the term multiplier refers to the ratio of the change in one of the variables to the change in the final demand that it brought about. Archer and Fletcher (1990) defined an economic multiplier as the ratio of direct, indirect and induced changes in an economy to the direct initial change. The authors further suggested that a multiplier:

- provides information about tourism impacts by identifying the relative significance of the tourism sector in creating income, employment and tax revenue;
- distinguishes the impact occurring within the tourism sector and its linkages to different economic sectors;
- provides a measure of the degree of interdependence between sectors, for example, the interdependence between the tourism sector and different sectors in an economy; and
- provides valuable inputs into the decision making process for policy makers, tourism organizations and ultimately for the government.

Multiplier analysis is part of an I-O model and allows the estimation of: (1) direct, (2) direct plus indirect and (3) direct and indirect plus induced effects of visitors' expenditure on outputs, incomes, value added, employment, and imports. Lin and De Guzman (2007) reported that the standard economic multiplier approach is the simplest and least expensive way to calculate multipliers. For example, equation (2.7) measures how much labour, interest and profit are involved in the final price of the product. The formula is (Lin & De Guzman, 2007, p.15):

$$Income\ multiplier = \frac{1}{1-(MPC \times PSY)} \qquad (2.7)$$

Where:

MPC = Marginal Propensity to consume locally and is the proportion of local income spent.

PSY = Proportion of a visitors' expenditure that is income to the local households.

Archer and Fletcher (1990) reported that the relationships between expenditure and output and income and employment are usually described by the term "multiplier". Most multipliers are expressed as a ratio of the total effects to the direct effects of increased or decreased expenditure. For example, a direct effect multiplier is called a "Type 1 multiplier" and an indirect effect multiplier is called a "Type 2 multiplier". Frechtling (1994) explained that multipliers can be estimated from I-O models based on estimated re-circulation of spending within the region. The Type I and Type II multipliers are derived as follows (Stynes, 1997, p.16) and (Chang, 2001, p.25):

$$Type\ I\ multiplier = \frac{Direct\ sales + Indirect\ sales}{Direct\ sales} \quad (2.8)$$

$$Type\ II\ multiplier = \frac{Direct\ sales + Indirect\ sales + Induced\ sales}{Direct\ sales} \quad (2.9)$$

Final demand, government and household expenditures, is the term for outputs to the final consumers of goods and services (Parra & Wodon, 2008). The commonly used multipliers are as follows (Narayan, 1995).

2.6.1 Output multiplier

Miller and Blair (2009) define an output multiplier for a specific sector as the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for the sector's output. The output multiplier is the ratio of change in gross output of all sectors to the change in final demand of a desired sector (Sum, Khatiwada, McLaughlin, Tobar, & Palma, 2007, p.7).

2.6.2 Income multiplier

The income multiplier allows us to explore the impact of a change in final demand for the sector on household income (Miller & Blair, 2009). Mazumder et al. (2009) said that the income multiplier measures the amount of income that has been generated as a result of a dollar injection of visitors' expenditure in the form of salaries, operating surplus and interest in the direct, indirect and induced impacts. Sum et al. (2007) reported that the income multiplier is the ratio of the change in income of all employees in the country to the change in the final demand of the desired sector.

2.6.3 Employment multiplier

This measures the effects of changes in an economic activity on total employment in the economy. The number of employees generated for a given unit of the visitors' expenditure can be estimated by the employment multiplier (Mazumder et al., 2009). The employment multiplier is the ratio of the change in total employment in the country to the change of US$1m in final demand output of a sector (Sum et al., 2007, p.7).

2.6.4 Value added multiplier

A dollar amount of value that has been added in salaries, operating surpluses and consumption of fixed capital from a unit increase in visitors' expenditure is called the value added multiplier (Mazumder et al., 2009). The higher the value added by the multiplier, the higher the impact in the domestic economy.

2.6.5 Import multiplier

The amount of visitors' expenditure leaking out of the economy to pay for imports of goods and services required to meet tourism consumption is called the import multiplier (Mazumder et al., 2009). Lower value of the import multiplier indicates that the tourism industry depends less on imports and vice versa.

2.7 Total economic impacts of tourism

The United Nations World Tourism Organization-UNWTO (1994) reported that the economic impact of tourism on an economy is initiated by visitors' expenditure and applying an I-O model to trace the effects of the expenditure in an economy. Economic multipliers using an I-O model examine the economic impact for a given change in the final demand on output, income and employment for direct and secondary effects resulting from the circulation of the visitors' expenditure within the economy (Stynes, 1997).

Albqami (2004) revealed that the I-O economic multipliers give a detailed picture of the impact of changes in final demand on output, income, and employment of an economy. These multipliers assist in a tourism impact study to track the effect of the demand for tourism activities on each sector. Oosterhaven and Fan (2006) documented that studies using an I-O model show large differences in income multipliers for visitors' expenditure varying from low values of 0.3-0.7 for different industries in Saudi Arabia (Albqami, 2004); 0.6 for Kenya (Summary, 1987); 0.7 for Tanzania (Kweka et al., 2003); and 0.9 for Singapore to 1.2 for Bermuda (Archer, 1995). Similarly, Santos, Oritz, Huang and Secretario (1983) found that the secondary impacts of tourism were greater than the direct impact because of strong inter-

industry linkages in the Philippines economy. The direct income effect of visitors' expenditure was 0.36 but the indirect effect was 0.44. The more an economy is self-sufficient, and purchases goods and services from within the economy, the higher the multipliers.

Most previous empirical studies on tourism impact emphasized estimating output and income multipliers by displaying the direct and indirect effects of the tourism sector. Stynes (1999, p.18) and Tohamy and Swincoe (2000, p.10) described the basic approach of estimating the economic impacts of visitors' expenditure (see Equation 2.10). Equation 2.10 describes the estimation of tourism economic impacts in three steps, a) calculating the number of visitors in the country, b) computing the average level of expenditure, and c) using multipliers to determine the total economic impacts of the visitors' expenditure in the economy.

$$Economic\ impact\ of\ visitors' expenditure = Total\ number\ of\ visitors \times average\ expenditure\ per\ visitor \times tourism\ multiplier \quad (2.10)$$

Wen and Tisdell (2001) used the I-O model in Yunnan Province, China, in 1990 and found that the tourism sector had high output and income multipliers in the provincial economy. Crompton (2000) conducted an economic impact study on tourism using an I-O model with visitors' expenditure including food and beverages, accommodation, retail shopping, transportation, admission fees, night clubs, lounges and bars and other expenses. The study used multipliers such as output, income and employment and found that the sectors most affected by the impact were food and beverages, retail shopping and accommodation.

Kim, Scott, Thigpen and Kim (1998) used an I-O model to estimate the direct, indirect and induced impacts of a tourism event on the local economy of the Rockport/Fulton region, Texas, US. The study focused on output, income and employment multipliers and found that the accommodation, food and beverages, and shopping sectors had the maximum impacts on the economy. The results indicated that spending among non-resident visitors contributed about US$2.5m in total gross output to the local economy. Frechtling and Horvath (1999) in the Washington D.C. area found ratio multipliers (indirect effects) were more appropriate than normal multipliers (direct effects). The tourism economic multipliers for Washington D.C. were relatively low compared with other US cities. The study also found many output and employment leakages because of Washington's small geographical size.

Mazumder et al. (2009) used an I-O model to examine the contribution of the tourism sector for the Malaysian economy by deriving multipliers in terms of output, income, employment,

value added and imports. The authors found that the tourism sector was relatively labour-intensive and an I-O economic multiplier analysis was useful in policy decision-making.

Any form of expenditure has direct and indirect effects in an economy. For the tourism sector, the direct effects are travel costs, hotel costs and indirect effects include other sectors of the economy that tourism affects such as agriculture, industry and energy (Fletcher, 1989). The total economic impact of tourism is the sum of direct, indirect and induced effects within a region. Indirect and induced effects are collectively called secondary effects (Stynes, 1997).

2.7.1 Direct, indirect and induced effects

The direct effects are those changes associated with the immediate effects of changes in the visitors' expenditure (Stynes, 1997). In other words, direct effects are production changes associated with the immediate effects of changes in the visitors' expenditure. For example, impacts from the visitors' payment to the hotel, food and retail trade result in sales.

Stynes (1997) reported that indirect effects are the production changes resulting from various rounds of re-spending of the hotel industry's receipts in backward linked industries. Narayan (1995) said that indirect effect refers to the effect of the first, second and subsequent rounds of output increases as successive purchases are made through the economy. For example, a hotel's payment for products such as energy, food, transport, linen and financial services.

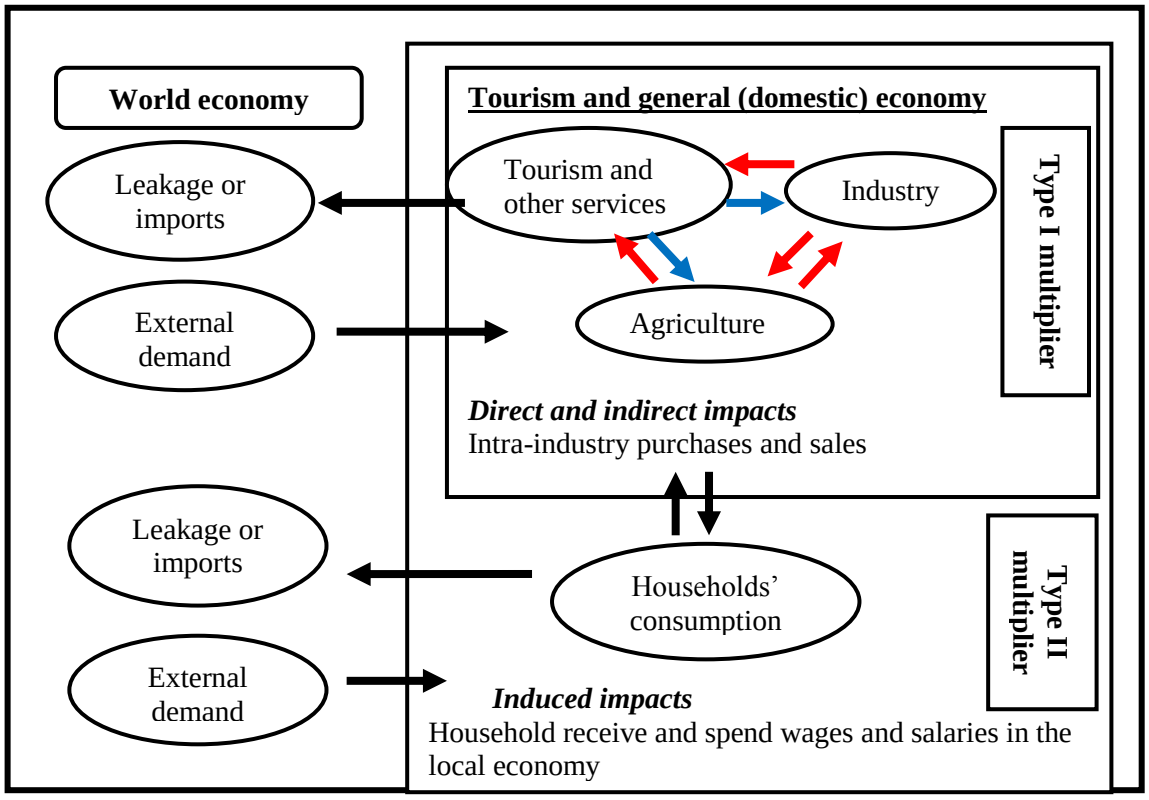
Induced effects are changes in economic activity resulting from household spending of income earned directly or indirectly because of the visitors' expenditure (Stynes, 1997). The sales, income and jobs that result from household spending of added wages, salaries, or proprietor's income, are induced effects (Narayan, 1995). For example, hotel and linen supply employees supported directly or indirectly by tourism, spend their income locally for their own consumption on housing, food, transport, and other household products and services.

2.7.2 Interaction of general economy and tourism economy

Figure 2.2 shows how the general and tourism economies interact in an economy. Pratt and Kay (2006) reported that the economy consists of the domestic economy and households, and the external economy in the form of imports and exports. The visitors' expenditure has direct impacts in the form of income to business and households for goods and services purchased by the visitors. Some tourist goods and services are imported to meet the visitors' demands and expenditure is lost to the system via imports. The Type I multiplier is associated with direct and indirect effects whereas the Type II multiplier is associated with induced effects. Government and businesses purchase tourism-related inputs to produce goods and services

available to the visitors. Indirect impacts provide a further round of income to businesses and households after the initial expenditure is multiplied throughout the economy. Pratt and Kay (2006) revealed that consumption-induced expenditure from the income of employees adds induced impacts to the economy created directly and indirectly by the visitors' expenditure.

Visitors' expenditure increases the interactions between the tourism economy and the general economy. With increased tourism demand in the country, the tourism sector purchases more outputs from the general economy, which is measured as backward linkages (see Figure 2.2 for red colour arrows). Similarly, because of increased tourism demand, more tourism products are available for the general economy to purchase from the tourism economy, which is measured as forward linkages (see Figure 2.2 for blue colour arrows).



Source: Adapted from Pratt and Kay (2006, p.26)

Figure 2.2 Interactions within the general and tourism economy.

2.7.3 Inter-industry linkages and key sector analyses

Inter-industry linkage analysis allows the comparison of different sectors of an economy in terms of the interdependence of their production structures (Pratt, 2009). Linkages using I-O models refer to the transactions among different economic sectors, for example; sectors that purchase and sell products to each other for production purposes. The United Nations (1999) explained that an I-O model takes into account the interaction of household income earned directly and indirectly from the economic activity and re-spending this income on different

sectors. The linkages have three components: backward, forward and total linkages. Azad (1999) reported that the backward linkage shows the amount a sector demands from other economic sectors, whereas the forward linkage shows how much an economic sector is demanded by the other economic sectors. Total linkages are the sum of both linkages.

The economic multipliers' effect measures only the backward linkages in the economy (Pratt & Kay, 2006). These multipliers do not account for the extent to which the outputs of a given sector are sold locally, i.e., the measurement of the forward linkages. Pratt and Kay (2006) further revealed that though forward linkages cannot act as an independent inducement mechanism, they act as important and powerful reinforcements of the backward linkages. Rasmussen (1956), Hirschman (1958) and Chenery and Watanabe (1958) outlined the measurement of the backward and forward linkages that indicate the importance of the different economic sectors in terms of their impact on the whole system. Hewings, Sonis, Guo, Israilevich and Schindler (1998) and Sonis et al. (1995) further modified inter-industry linkage and key sector analyses methods making these calculations more reliable and more widely applicable to verify how the influence of each economic sector is distributed over the economy. This is called the I-O Multiplier Product Matrix.

I-O multipliers provide useful information about the impacts of changes in exports and domestic demand; they reflect only backward linkages but many sectors' importance lies in their forward linkages (Pratt & Kay, 2006). A number of previous studies have considered that the combined estimation of economic multipliers along with inter-industry linkage analysis would be ideal to capture the overall impact and importance of the different economic sectors in an economy (Arabsheibani & Delgado-Aparicio, 2002; Bonet, 2005; Cai, Leung, & Mak, 2006; Kula, 2008; Lejarraja & Walkenhorst, 2007; Sharma, 2002; Sharma, Leung, & Nakamoto, 1999). Arabsheibani and Delgado-Aparicio (2002) explained that a forward linkage is measured by the index of sensitivity that shows how much an economic sector is demanded by the different sectors and a backward linkage is measured by the index of the power of dispersion, which shows the amount a sector demands from different economic sectors. Weak forward and backward linkages between sectors indicate that the economy is poorly integrated and heavily dependent on imports (Pratt & Kay, 2006).

2.7.4 Backward and forward linkages

Miller and Blair (2009) explained that a backward linkage serves as an indicator of an industry's relative importance as a user of inputs from the production sector. Backward linkages are demand oriented (Drejer, 2003). A sector with a higher backward linkage value

represents a sector with a higher effect on the demand for domestic production (Cai & Leung, 2005). A backward linkage is calculated as follows (Pratt, 2011; Sharma, 2002, p.2):

$$BL_i = \frac{\sum_i Xij}{Xj} \text{ or } \frac{\sum_i X_{ij}}{\sum_i^n \sum_i^n X_{ij}} = \sum_i aij \quad (2.11)$$

Where:

BL_j = Backward linkage of the j^{th} Sector,

X_{ij} = Amount of commodity '*i'* used in the production of commodity '*j',*

X_j = Gross output of j^{th} sector (column vector) which consists of total intermediate purchases and gross value added, and

a_{ij} = I-O coefficient which explains the amount of i^{th} commodity used in the per unit production of the j^{th} commodity.

According to Miller and Blair (2009) a forward linkage serves as an indicator of an industry's relative importance as a supplier of inputs from the production sector. A forward linkage is supply oriented (Drejer, 2003). The higher the value of the forward linkage of a given sector, the larger will be the impact on the price level of the sector in the economy (Cai et al., 2006). The forward linkage is calculated as follows (Pratt, 2011; Sharma, 2002, p.2):

$$FL_i = \frac{\sum_j Xij}{Xi} = \frac{\sum_j X_{ij}}{\sum_j^n \sum_j^n X_{ij}} \quad (2.12)$$

Where:

FL_i = Forward linkage of the *i*th sector,

X_{ij} = Amount of commodity '*i'* used in the production of commodity '*j',* and

X_i = Gross output of *i*th sector (row vector) which consists of intermediate and final demands.

2.7.5 Total inter-industry linkages

The total inter-industry linkages is the sum of the backward and forward linkages (Sharma, 2002, p.2).

$$TIL_j = \sum_i aij * \quad (2.13)$$

Where:

a_{ij}* = Leontief inverse i.e. $(I-A)^{-1}$ matrix,

I = Identity matrix,

A = I-O coefficient matrix, and

TIL_j = Total inter-industry linkage of the *j*th sector.

Drejer (2003) argued that, from a policy perspective, backward linked sectors are more important than forward linked sectors because backward linked sectors influence the rest of the economic system through the multiplier effects. Forward linked sectors are those sectors that are most influenced by the backward linkages (Drejer, 2003). For example, the value of the total backward linkage index of the tourism sector indicates the output relevant to tourism (including the output of the tourism sector itself) to the total output of the economy.

The Rasmussen (1956), Hirschman (1958) and Chenery and Watanabe (1958) linkage indices do not take into account the levels of production in each sector of the economy (Sonis et al., 1995). Using only these indices may result in misleading interpretation because the sector can be identified as a key sector due to its higher backward and forward linkages. For example, the economic sector may have a small volume of production ultimately contributing less to the total economy and the sector with weak backward and forward linkages might have large volume of production but contribute more to the country's economy in absolute terms. To overcome these shortcomings Sonis et al. (1995) suggested the measurement of the pure linkages of the economic sectors.

A linkage value above one for a given sector indicates that the sector draws more than average from the economic system (Parra & Wodon, 2008). A linkage value below one means the sector draws less than average from the economic system. In general, all linkage index values would equal one if all sectors drew evenly from the economic system (Sonis et al., 1995). The authors recommended a combination of the Rasmussen-Hirschman index, Chenery-Watanabe index, pure linkage index, weighted linkage index and I-O multiplier product matrix to obtain reliable values on the impacts of an economic sector and the overall structural change in the economy.

In Hawaii, Cai et al. (2006) observed the strengths of inter-industry backward and forward relationships between tourism and non-tourism sectors using 1987 and 1997 I-O tables. The web of inter-industry relationships differed whether the industries produced goods and services for tourism consumption or non-tourism use. However, the research found that, except for a few tourism-related industries, such as hotels and air transportation, which sell most of their output directly to tourists, in most other sectors, the web of forward linkages tended to be greater when producing for tourism than for non-tourism consumption.

Azad (1999) revealed that electricity-gas, transport-communication and public administration created greater backward linkages, and trade and banking-insurance created larger forward linkages in Bangladesh economy. With regard to total linkages, the bank-insurance, electricity-gas and transport services ranked higher than other services. This means an

increase in the final demand for one unit of output in these services will bring forth a greater increase in total output of the Bangladesh economy than other sectors.

2.7.6 Pure linkage indices

Drejer (2003) found that the economic interdependence and linkages analysis by the traditional backward and forward linkage approach have become less appropriate for identifying core relations in the economic system. This underlines the need for a re-evaluation of linkage measures that examine linkages in monetary terms. To overcome this problem, Sonis et al. (1995) and Guilhoto, Hewings and Sonis (1997) used the pure linkage index of forward, backward and total inter-industry linkages to measure the importance of a given sector for the rest of the economy in terms of its total output value. The pure backward and forward linkages take into account monetary values that are weight factors of the sector's linkage power, which is different from the standard inter-industry linkages analysis methods. Based on the work of Cella (1984) and Clements (1990) on the "decomposition approach" for linkages analysis, Sonis et al. (1995) modified and extended linkages computation to provide a set of linkage measures of the economic sectors. Cai and Leung (2005) derived the "re-composition approach" that provides explicit and reliable interpretations of the pure linkages. Cai and Leung (2005) supported the formulae for linkages calculation derived by Sonis et al. (1995) for pure linkage analysis, but gave different interpretations and suggested more direct interpretation of the pure linkages.

2.7.7 Weighted linkage indices

Leoncini et al. (1996) and During and Schnabl (2000) followed Cuello et al.'s (1992) work on weighted linkages and proposed the estimation of weighted linkages in the I-O model to obtain a more accurate measure of the economy-wide important key sectors. The concept uses the relative importance of final demand and total sector output as weights while estimating the inter-industry linkages of economic sectors. Drejer (2003, p.10) explained that introducing weights to the economic sector based on their production scale while calculating the linkages is the investment induced by the key sectors. The author argued that weighted backward linkage values depend on the level of demand for inputs among different economic sectors while the weighted forward linkage values depend on the level of supply of inputs.

2.7.8 Input-Output Multiplier Product Matrix

The field of influence approach developed by Sonis and Hewings (1989; 1994) showed how the influence of each sector is distributed over the other sectors of the economy, which is also called the Multiplier Product Matrix (MPM). MPM is an economic measure that is useful to assess the relationship of one sector to the rest of the economy. Sonis, Hewings and Guo

(1997) expanded the MPM concept as a field of influence to all economic sectors to estimate the impacts of both backward and forward linkages. The MPM approach describes how changes in direct coefficients are distributed in the economic system to determine the relationship among the different economic sectors by identifying the key sectors (Sonis et al., 2000). Parre, Alves and Sordi (2002) argued that the I-O MPM concept is an additional analysis to the Rasmussen-Hirschman and Chenery-Watanabe linkages, since the main connection links in the economy appear in the sectors that have the highest linkages.

The re-composition (aggregation) of backward and forward linkages outlined by Guo, Hewings and Sonis (2005) provides an extra dimension to compare the importance of economic sectors. Following the Rasmussen and Hirschman indices, the backward linkage index is plotted on the X-axis and the forward linkage index is plotted on Y-axis. The sectors that have backward and forward linkages greater than one determine the sectors with coefficients that have greater value in the field of influence (Sonis et al., 1995).

2.7.9 Key sector identification

Key sectors have a greater influence on the economy through both purchases and sales within the economy. A key sector means that an increase in the final demand of the sector's output will have a large impact on the sectors that supply inputs to the production of the key sector's output (Drejer, 2003). Key sectors play an important role in stimulating the process of economic development and diversification of industrial structure of the economy (Hazari, 1970). Key sectors influence more than other average performing sectors in the economy which is useful to make decisions on policy, planning and investment in the country.

Andreosso-O'Callghan and Yue (2004) and Parra and Wodon (2008) reported that if the values of both the backward and forward linkage indicators of a sector are above the corresponding averages, the sector is a key sector. However, Matallah and Proops (1992) classified key economic sectors based on the linkages index as strong (linkage index ≥ 1), intermediate ($1 >$ linkage index ≥ 0.9) and weak ($0.9 >$ linkage index) linkages. Kweka, Morrisey and Blake (2003) determined the number of sectors that would be considered key sectors in Tanzania using the Multi Rank Index (MRI) approach. The authors assigned new values/scores to all economic indicators such as output multiplier, GDP, and employment index to all economic sectors based on their performance rankings and the sectors that achieved the highest total scores were identified as key sectors.

2.7.10 Summary of previous findings on linkages and key sector analyses

Table 2.2 summarises previous findings on the linkages and key sector analyses in different economies in the world.

Table 2.2 Summary of main research findings on inter-industry linkage analyses using different approaches.

Researcher(s)	Economy	Inter-industry linkages used	Main findings
Archer and Fletcher (1990)	Seychelles	Backward and forward linkages	The principal tourism activities such as transport, communication, restaurants and hotels have strong backward linkages in the economy. Likewise, transport, public services, trade, other services, food and beverages manufacturing have high forward linkages.
Surugiu et al. (2009)	Romania (2000 and 2005 data)	Rasmussen-Hirschman, Chenery-Watanabe linkage, key sector analysis	The authors derived inter-industry linkages between tourism (hotel-restaurant-travel agency) and different economic sectors. The sector was ranked 11th of 19 sectors considered for backward and forward linkage analysis. The sector has a medium capacity to increase total production due to an increase in final demand and inputs from the rest of the economy.
Kula (2008)	Turkey (2000 data)	Rasmussen-Hirschman, Chenery-Watanabe linkage, key sector analysis	The Chenery-Watanabe linkage approach identified 20 key sectors but Rasmussen-Hirschman linkage approach found 18 key sectors. The common 12 key sectors of the 56 sectors considered in both approaches include the agriculture, food and beverages, wholesale and retail trade and tour agency sectors.
Economic Review (2003)	Malaysia (2002 data)	Backward and forward linkage analysis	The study found that the hotel and restaurant industry consumed much of its intermediate inputs from industries such as agricultural products, fisheries, wholesale and retail trade, real estate, electricity and gas. Over 80 percent of total visitors' expenditure was from the accommodation, shopping, food and beverages and local transportation sectors.
Kweka et al. (2003)	Tanzania (1992 data)	Multi Rank Index approach (23 sectors)	Tourism contributed to tax revenue and foreign exchange earnings through significant impact on strong inter-industry linkage effects. The sectors most important for tourism demand impacts were food and beverages, fishing, staple food and wholesale and retail trade. Tourism achieved a significant backward linkage (1.16), ranked third highest and forward linkage (1.13) higher than agriculture, manufacturing and other services sectors.
Beynon, Jones and Munday (2009)	Welsh economy	Chenery-Watanabe, Rasmussen-Hirschman and Eigenvector	The authors undertook an inter-industry linkage analysis of 11 tourism related sectors out of 79 economic sectors. Recreation and welfare, transportation, guest houses and non-service accommodation were considered the key sectors of the tourism related sectors; they achieved greater values of backward and forward linkages than other economic sectors.
Bonet (2005)	Colombia (1985, 1992 and 1997 data)	Rasmussen-Hirschman, pure linkage and I-O MPM approaches	The structural change pattern indicated that the key sector interactions had moved from the primary sectors (agriculture and mining) and secondary sectors (non-durable and durable manufacturing) to tertiary sectors (utilities and private sectors) providing the evidence supporting a tertiary sector transformation that occurred during the 1990s.
Parre, Alves and Sordi (2002)	Brazil (1992 data)	I-O MPM, backward and forward linkages and key sector analysis	The backward linkage index considered 11 of 22 sectors as key sectors. When a similar analysis was undertaken for forward linkages, nine sectors obtained key sector status. The results also revealed that chemical industry, food products, textile industry and commerce were key sectors and that farming had a relatively lower importance than expected.

Researcher(s)	Economy	Inter-industry linkages used	Main findings
Timms (2006)	St. Lucia, Caribbean	Standard backward and forward linkages	The author outlined the problems/prospects of agriculture-tourism linkages and the results suggested that promoting linkages between hotels and groups of farmers (cooperatives) had the greatest potential to stimulate local agricultural production and consumption.
Pratt (2009)	Hawaii (seven databases from 1967 to 2005 data)	Standard backward and forward linkages	Eleven out of 18 sectors had above average backward linkage including the tourism-oriented sectors such as transportation, accommodation, real estate-rentals and eating-drinking. Across the seven databases from 1967 to 2005, the accommodation sector's forward linkage index varied from 0.81 to 0.74 and the eating-drinking sector's forward linkage index varied from 0.87 to 0.77. Transportation was the key sector driving the linkages in the tourism industry and the backward linkages of the tourism sector strengthened as visitors' expenditure as a proportion of Gross State Product increased.
Andreosso-O'Callaghan and Yue (2004)	China (1987 and 1997 data)	Rasmussen-Hirschman, Chenery-Watanabe, pure linkage, total linkage and key sector approaches	The study found that the average backward and forward linkages had generally increased during 1987-97. High total linkage coefficients were concentrated mainly in agriculture, manufacturing, construction and services sectors. Although the list of key sectors in the economy differs among the various approaches used, the core key sectors comprised agriculture, textile, chemicals, construction, primary metals, commerce and other services. The authors chose the pure linkage method over the total linkage method for its better results for the key sector identification.
Secretario, Kwangmoon, Trinh, Nor and Manh (2009)	Cambodia, Thailand and Vietnam (2000 and 2005 data)	Backward and forward linkages, key sector and Self sufficiency rate analysis	Two sectors for Cambodia (textile and transport), three sectors for Thailand (food and beverage, electricity-gas and transport) and four sectors for Vietnam (food and beverage, paper, non-metal and metal production) were identified as key sectors in 22 sectors in their economies. The studies computed the backward and forward linkage values of the hotel and restaurant sector as follows: Cambodia: 1.30 and 0.97; Thailand: 1.16 and 0.72 and Vietnam: 1.05 and 0.75, respectively. The sector occupied the category of high backward linkage and low forward linkage sector in all countries. Among the three economies, Thailand appears to be the only self-sufficient economy among them with a Self Sufficient Rate of 1.03.
Reis and Rua (2006)	Portugal (1995 and 1999 data)	Backward and forward linkages and key sector analysis	The I-O model provided a better measurement of both backward and forward linkages and key sector analysis since it could account for domestic linkages. Service sectors, obtained lower linkage values than industry sectors.
Sharma, Leung and Nakamoto (1999)	Hawaii (1992 data)	Backward and forward linkages	The study was based on aggregated 46 sectors out of 118 to assess backward and forward linkages between agriculture and different economic sectors. Agriculture generated about 22 percent of value added, 20 percent of input and labour income and 16 percent of employment in the state which received significant inter-industry linkages among the farm production, food and fibre processing sector and other service sectors of the economy.

Researcher(s)	Economy	Inter-industry linkages used	Main findings
Azad (1999)	Bangladesh	Backward and forward linkages and key sector analysis	The electricity-gas, transport-communication and public administration sectors created greater backward linkages among the eight service sectors considered. The trade and banking-insurance industry created larger forward linkages. On the basis of total linkages, banking-insurance (3.22) ranked first, electricity-gas (1.92) ranked second, transport (1.70) ranked third, and trade (1.16) ranked fourth; they dominated other service sectors in the Bangladesh economy.
Matallah and Proops (1992)	Algeria	Backward and forward linkages and key sector analysis	The research used linkage analysis and found that the services and construction sectors were key sectors but manufacturing, energy and water nearly qualified as key sectors. The Algerian development strategy with a priority of heavy investment in capital intensive industries did not generate extensive inter-industry linkages.
Sharma (2002)	Fiji	Backward and forward linkages	Estimated inter-industry linkages between farm and non-farm sectors and found agriculture ranked second in forward linkages and last in backward linkages compared with non-farm sectors. In total inter-industry linkages, food processing (1.72) ranked first, building and construction (1.51) ranked second, and other manufacturing and mining (1.38) ranked third among the aggregated eight sectors considered.
Oosterhaven (2008)	USA, China, South Korea and Holland	Backward and forward linkages and key sector analysis	Used the net value over gross value approach while identifying key sectors and forward and backward linkages analyses. The gross and net forward linkages showed a relatively strong correlation whereas the gross and net backward linkages showed no correlation at all.
Midmore, Munday and Roberts (2006)	Welsh economy	Rasmussen-Hirschman and Eigenvector	The Eigenvector approach was shown to be the better indicator of inter-industry linkages than the Rasmussen-Hirschman approach.
Tunc, Akbostanci and Asik (2009)	Turkey (1998 and 2002 data)	Backward and forward linkages and key sector analysis	The key sectors were different for the study periods among the 42 sectors. Agriculture-husbandry, electricity-transportation and other services (including tourism) were the key sectors in 1998 but, in 2002, mining, food, beverages and tobacco and coke products industries were identified as the key sectors.
Guilhoto and Filho (2005)	The Amazon region of Brazil	Standard, pure linkage and I-O MPM	The authors used normalized pure linkage indices by the average value of the sectors in the economy. The normalized indices showed how many times a sector was bigger or smaller than the average sector in the economy.

2.8 Chapter summary

This chapter discussed the different approaches to the estimation of economic multipliers, inter-industry linkages and key sector analyses used in previous studies. Tourism is a multi-sector industry and there are a number of issues, such as, availability of data, type of national accounts, classification of economic sectors, to be considered when estimating the economic impacts. In estimating the economic impact of tourism in Lao PDR, I-O models are suitable because they provide comprehensive details and give analytical and descriptive analyses of the economic impacts. As discussed by Wicke (2006), an I-O model determines the impact on the whole economy, which makes the analysis a valuable and irreplaceable tool in economic impact assessment of tourism. Despite I-O models' few shortcomings, the method is suitable for both developing and developed countries to assess the economic impact in that it is able to account for the direct, indirect and induced impacts on the economy without requiring complex and sophisticated models, large data sets and significant time inputs.

Tourism economic multipliers measure the economic impact or effects in terms of output, income and employment resulting from a change in the final demand within an economy. Economic multiplier estimation provides additional information on accuracy and easy application to economic impact studies. Backward and forward linkages are standard traditional inter-industry linkage analyses. Likewise, pure linkage, weighted linkage and I-O MPM are modern approaches with wider applications and provide an extra dimension to interpret the tourism sector's linkages analysis to the different economic sectors. Sonis et al. (1995), Guo et al. (2005) and Cai and Leung (2005) revealed that different inter-industry linkage approaches complement each other for the inter-industry linkage and key sectors analyses and derive new and better ways of explaining and interpreting.

Chapter 3
Data and Methodology

This chapter describes the research data and methodology used in the study. The first section presents a description of the research site followed by the data sources and collection methods used in the second section. The third section describes the variables, research models and the application of the econometric software for data analysis. The fourth section presents the specific methods to estimate the tourism economic multipliers and the total economic impact of the tourism sector on the Lao PDR economy. The next section describes the methods to compute inter-industry linkages, self sufficient rate calculation and key sector identification of different economic sectors of the economy. The final section concludes the chapter with a summary.

3.1 Description of the research site

Lao PDR is well endowed with an abundance of natural, cultural and historical resources suitable for tourism development in the country (see Lao PDR map in Appendix 1). Recently, the tourism sector has been considered an important economic sector as a source of foreign exchange earnings to reduce the balance of payments deficit with increased tourism gross receipts for the country. Tourism has stimulated economic activity to the tourism sector directly as well as generating multiplier effects in different sectors of the economy. Table 3.1 shows the key macroeconomic figures in Lao PDR during 2003 and 2008. The population of the country was 5.9 million in 2003 and 6.7 million in 2008. The service sector contribution has increased from 26 percent (2003) to 34 percent (2008). Total employment in the country has increased from 79,705 in 2003 to 121,391 (2008) while the number of foreign employees increased from 1,735 to 22,699 persons.

Table 3.1 Key macroeconomic indicators of Lao PDR (2003 and 2008).

Description	Unit	2003	2008	Increment/annum (%)
1. Population	Million	5.92	6.67	2.5
2. Gross Domestic Product				
- Agriculture	%	41	36	-2.4
- Industry	%	35	30	-2.8
- Services	%	26	34	6.2
3. Employment				
- Domestic	Persons	79,705	121,391	10.5
- Foreign	Persons	1,735	22,699	241.7

Sources: Ministry of Labour and Social Welfare, Lao PDR; National Statistical Centre, Lao PDR; and Statistical Year Books of 2003 and 2008 (National Statistics Centre, 2003, 2008)

Total international visitor arrivals in 2008 in the world were 922 million; the GMS received 27 million, which is three percent of the total world arrivals (UNWTO, 2009). Lao PDR received 1.74 million visitors in 2008 (LNTA, 2009). Visitor arrivals and receipts have increased significantly in Lao PDR in the last decade. According to LNTA (2009), visitor arrivals' annual increment during 1995-2008 in the GMS was around nine percent and 13 percent in the Lao PDR. In 1995, the GMS tourism market share to the Lao PDR was 3.5 percent but in 2008 it was over six percent (LNTA, 2009). The Lao PDR agriculture, industry and services sectors grew at 3.7, 10.4 and 9.7 percent, respectively, in 2008 and the GDP per capita was US$875 that year (National Statistics Centre, 2009).

The World Bank (2009) reported that international visitors spend an average of US$32 per day and stay an average of 4.5 days based on the 2004 data for the Lao PDR. Tourism is considered one of the highest national GDP and foreign currency earners in the country (LNTA, 2008). In the last decade, the importance of tourism as a contributor to the Lao PDR national GDP and as a source of employment is being increasingly recognized. The direct economic contribution of the tourism sector in 2003 was US$87m but it was US$275m in 2008, an estimated eight percent of the national GDP (LNTA, 2009).

3.2 Data sources and collection

The following methods were used to gather data for the study:

a) Primary data sources were:
   - a structured questionnaire survey for international visitors' expenditure; and
   - a structured interview and discussions with tourism stakeholders

b) Secondary data

These data collection methods are discussed briefly in the following section.

3.2.1 Primary data: Structured questionnaire for international visitors' expenditure

This study collected primary data on visitors' expenditure in the primary tourism sectors in the Lao PDR to estimate the direct economic impact of international tourism in the country. The primary tourism sectors considered in this research are: a) accommodation; b) food and beverages; c) shopping; d) transportation; e) entertainment; f) communications; g) attractions; h) visa fees; and i) miscellaneous. The survey questionnaire was designed to collect the information on the length of stay and total expenditure by categories that were then totalled with the total visitor arrivals in the Lao PDR to obtain the total spent in the specific year. The impact, which was estimated from the visitors' expenditure, was used to estimate the total economic impact incorporating the result into the economy-wide I-O models of the Lao PDR.

Convenience sampling was used to administer the structured survey questionnaire to international visitors departing from the Lao PDR. Vientiane, the capital of the Lao PDR, was selected for the survey because the majority of international visitors (over 95% based on the LNTA 2008 estimate) pass through the capital to the other parts of the country. The survey questionnaire was developed based on the tourism activities identified by the United Nations International System for Industrial Classification (UNISIC) that recommends the categories for the tourism sector as follows (United Nations, 1999, p.211-212):

- Hotels, camping sites and other provisional of short stay accommodation
- Restaurants, bars and food courts
- Transport (scheduled and non-scheduled air, land and boat transport)
- Renting and activities of travel agencies and tour operators
- Entertainment activities, tour guides' fees
- Library and archive activities
- Museum activities and preservation of historical sites and buildings
- Botanical and zoological gardens and nature reserves
- Sporting activities and other recreational activities
- Other direct purchases (apart from the above)

The survey was an exit survey where the international visitors were surveyed at the end of their trip in the departure lounges of the international airport at Vientiane and the Lao PDR-Thailand border crossing point (Nongkhai Friendship Bridge). These are the border crossing points for the majority of visitors to the country (LNTA, 2008, 2009). Table 3.2 shows the visitors' expenditure categories and variables included in this study.

Table 3.2 Visitors' expenditures variables and codes used in this study.

Expenditure categories	Codes used	Descriptions of the expenditure incurred on...
Accommodation	Accom	hotel/motel, rental apartment, guest houses, etc.
Food and beverages	FoodBev	food and all kinds of drinks
Shopping	Shop	groceries, souvenirs/ gifts and other manufactured goods (either retail or wholesale)
Local transportation	LocTrans	air ticket, vehicle rental, repair, insurance, gas and oil, including payments made for organized tours
Communication	Comm	phone, internet and postage
Sightseeing	Sightsee	natural, cultural, historic, urban and rural sites (entry fee, donations, tour guide fees, etc.)
Entertainment and recreation	EnterRec	urban and rural based entertainment and sports/recreation related expenditures
Visa fee	VisaFee	applying and processing fees for visa
Miscellaneous	Misce	other expenditure such as photos, newspaper purchases and expenses not mentioned above

The survey questionnaire was designed in English and the international visitors who were able to read and write English were eligible to participate in the survey. The international visitors were approached in the departure lounges of the Lao PDR border crossing point (Nong Khai) and international airport at Vientiane. However, some of the visitors (1 out of 5 visitors) declined to participate because of the lack of English proficiency, lack of time and/or for different reasons. A total of 417 international visitors were surveyed during November-December 2009 using a 95% confidence interval (Yamane, 1967). The formulae computes >100,000 population at 95% confidence interval generated a sample size of 400. This study was conducted with the approval of Lincoln University Human Ethics Committee (see Appendix 15). Although the data were collected in the high season of visitor arrivals in the Lao PDR, the mega event of sport being the 25th South East Asian (SEA) Games in Vientiane, was avoided. The collection of data during that period could have brought possible sample bias, which could inflate the research data. Similarly, the recent economic recession in the world has not had much impact on Lao PDR economy and tourism since both economies grew faster than expected during the study period (see ADB, 2011; LNTA, 2010).

The visitors' expenditure survey questionnaire was divided into four sections a) expenditure by categories; b) package tour; c) non-package tour; and d) demographic and socio-economic characteristics of the respondents (see survey questionnaire in Appendix 17). Together with the visitors' expenditure, the survey questionnaire included socio-demographic variables such as frequency of visits, accompanying visitors, duration of visit, occupation, gender, mode of arrival, sources of information, major tourist attractions and purpose of visit. These variables were analyzed using SPSS 15.0 and an Excel Spreadsheet.

The effects of visitors' expenditure are influenced by the spending behaviour or patterns of the international visitors. Spending behaviour depends on factors such as nationality, age of tourists, purpose of visit, types of accommodation and duration of stay. If a greater proportion of expenditure is in sectors with fewer linkages or with strong dependence on imports, the multiplier or the effects of visitors' expenditure will be minimal (Tohamy & Swinscoe, 2000).

Although visitors' nationality/origin was collected in the questionnaire survey, the results were analysed based on LNTA's classification of the most important tourist markets for the Lao PDR tourism sector. This study focused on the origin of visitors based on their nationality which was grouped as in Table 3.3. Thailand, Vietnam and China are the three countries contributing the largest total arrivals in Lao PDR. Other South East Asian (SEA) countries excluded the Mekong Countries to avoid repetition. Similarly, North American countries

included the US and European Union member countries in Europe. Likewise, East Asia and the Pacific countries and Rest of the World were the remaining group of countries considered in this study (see Table 3.3).

Table 3.3 Nationality of international tourists' visiting Lao PDR.

	Country/region	Region/countries included in data
1.	Thailand	Thailand
2.	Vietnam	Vietnam
3.	China	China
4.	Cambodia and Myanmar	Cambodia and Myanmar
5.	Other SEA countries	Other SEA countries*
6.	Europe	EU member countries
7	America	North American countries
8.	East Asia and the Pacific	East Asian and the Pacific countries
9.	Rest of the world	South/Central Asian and other countries

Note: *Other SEA countries in this study include Indonesia, Malaysia, the Philippines and Singapore.

Apart from tourism's direct contribution to the economy, tourism has significant linkages with many different economic sectors such as agriculture/food, transportation, manufacturing, handicrafts, real estate and construction. It is estimated that for every item of visitors' expenditure over a dozen transactions often take place in the country. Each transaction calls for a supply of goods and services to meet the visitors' needs. Visitors' expenditure therefore not only induces more employment but also generates a ripple effect through a chain of transactions (Mazumder et al., 2009).

3.2.2 Primary data: Interview with tourism stakeholders

Interviews with tourism stakeholders included officials from LNTA (as the public sector), the private sector (hotels, restaurants, and travel agent owners), NGOs and community organizations working in tourism, the donor community and regional tourism organisations, and different tourism related stakeholders. A total of 22 stakeholders were selected and interviewed to gather their opinions on tourism's contribution to the Lao PDR economy as well as the problems and constraints the sector faced in the country (see tourism stakeholders' interview questions in Appendix 18). Purposive selection was done to identify stakeholders because the researcher wanted to obtain opinions from different stakeholders involved in the tourism sector in the Lao PDR. The list of tourism stakeholders was finalized based on initial discussions and meetings with the LNTA officials. They were:

A) Hotels, Restaurants and Travel Agents
    i. Lao Association for Travel Agents (LATA)
    ii. Lao Hotel and Restaurant Association (LHRA)

iii. Mekong Lao Travel Agent

iv. Lane Xang Hotel

B) Lao National Tourism Administration (LNTA)

i. Department of Planning and Coordination

ii. Department of Tourism Promotion and Marketing

iii. Department of General Adminstration

iv. Department of Tourism and Hotel Management

v. Department of Tourism and Hospitality Training Center

C) Non-Government Organizations (NGOs)

I. Green Discovery, Laos

II. Ecotourism Laos, Vientiane

III. Ecotourism Laos, Luang Prabhang

IV. Luang Prabhang Community SNV project

D) Regional Tourism Organizations

I. Mekong Tourism Coordination Office (MTCO)

II. United Nations Educational, Scientific and Cultural Organization

III. Mekong Institute (MI)

E) Donor Community

I. German Development Service (DED)

II. Asian Development Bank (ADB)

III. Luxembourg Agency for Development Cooperation

IV. Netherlands Development Organization (SNV)

V. Japan International Cooperation Agency (JICA)

A senior officer from each of the organization working on the tourism sector in the country was selected for the tourism stakeholders' interview. The interviews were conducted between November 2009 and January 2010. All interviews were conducted face to face with the selected respondents except one was conducted online because the stakeholder institution and the interviewee was located in Luang Prabhang, Lao PDR. Additional information and data on tourism were collected from LNTA and National Statistics Centre (NSC) of the Lao PDR.

3.2.3 Secondary data

The secondary data required for the I-O model were obtained from NSC, Lao PDR, for the year 2008. Secondary data on tourism were also obtained from the LNTA. Specifically, the following statistical data sources were collected to estimate and update the I-O tables:

- national accounts containing various macroeconomic totals by economic sectors including sector imports and exports;
- production accounts supplying gross outputs, gross value added, final demand and total intermediate inputs for economic sectors defined in national accounts; and
- statistics on taxes and production subsidies.

Secondary data such as the 2003 I-O table compiled by the ADB and the study by Asra et al. (2006) in the Lao PDR complement the visitors' expenditure survey in our study. The mixed or hybrid method (using both primary and secondary data) was used to generate the I-O models at the national level for 2003 and 2008 in the Lao PDR. The actual gross inputs and outputs for both years were employed in order to construct and update I-O tables of the Lao PDR. I-O coefficients of the 2003 I-O table were used to update and balance the 2008 I-O table.

3.3 Data analysis methods

The study used 2003 (pre-construction of the Economic Corridors) as the base year for the I-O model of 20 economic sectors defined by the NSC to compare with the 2008 data (after completion of the construction of the Economic Corridors). The 2008 I-O table was updated to analyse the economic impact of Lao PDR tourism as the latest I-O construction year. Tourism is not a distinct sector in the industrial classification of economic activity in the national accounts of Lao PDR (see list of economic sectors in Appendix 2). Therefore, aggregation and disaggregation of the tourism data from the national accounts have been performed to construct the I-O tables (see list of economic sectors in Table 3.4 and Appendix 3). The I-O model contains two economies in this study: the Lao PDR and the Rest of the World. Following aggregation of the 20 economic sectors into 14 sectors including a tourism sector, a comparison was made using the I-O models for 2003 and 2008. With the visitors' expenditure survey and the secondary data available that are appropriate for the national accounts, the I-O model is the best employed at a relatively low cost and provides both a descriptive and analytical tourism economic impact of the Lao PDR. Figure 3.1 shows an overview of the research methods, particularly the steps to analyse the Lao PDR I-O tables.

Step 1: Construction of the 2003 Lao PDR I-O table: The 20 sector Lao PDR I-O table was aggregated to a 13 sector I-O table for Year 2003 following the Handbook of Input-Output Construction and Update (United Nations, 1999). The main reason was to focus only on the tourism related sectors and match with the visitors' expenditure categories for data analysis (see Figure 3.1).

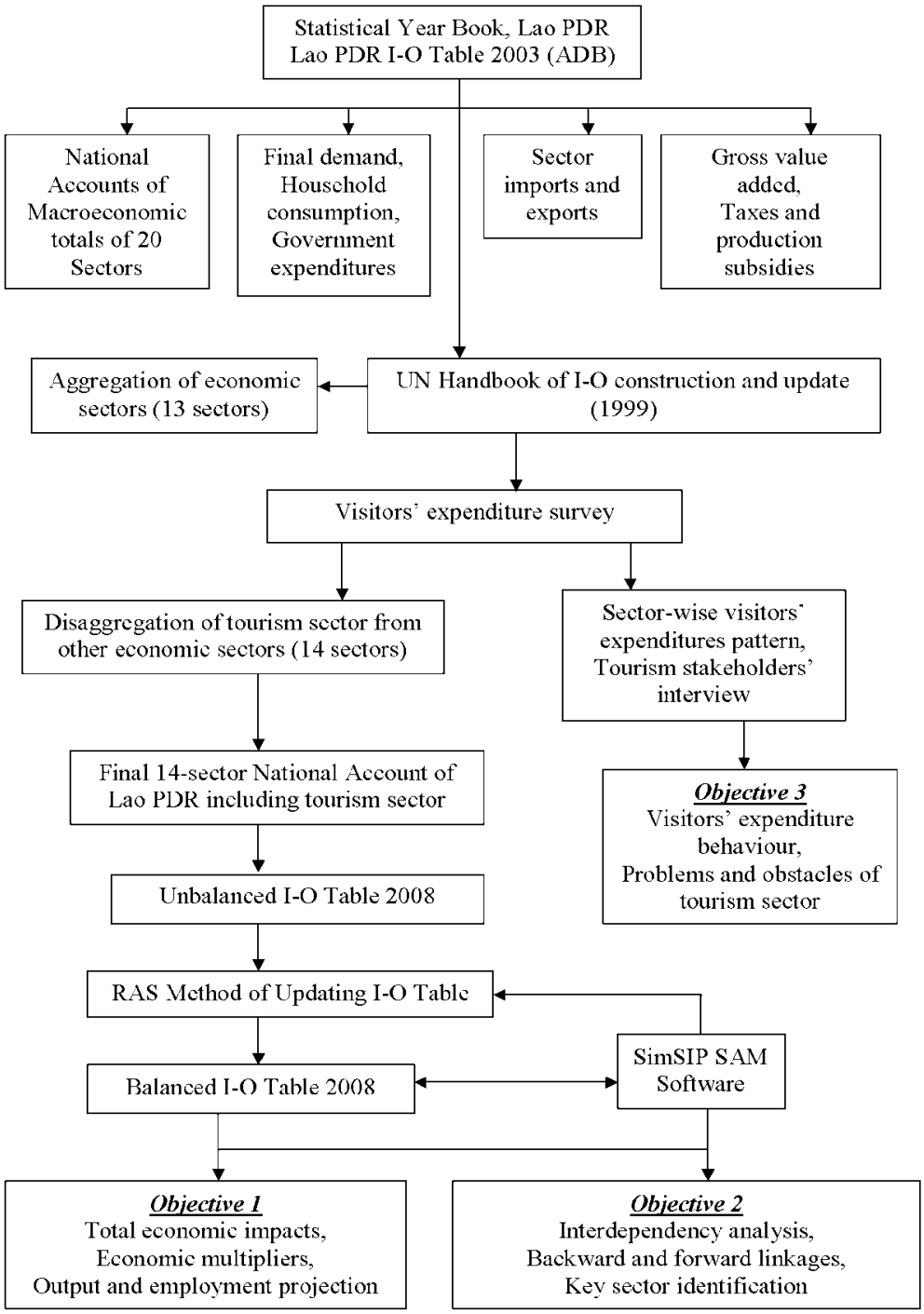


Figure 3.1 Overview of the research methods and procedures.

Step 2: Quantification of the tourism sector's contribution to the Lao PDR economy: The quantification of the tourism primary sector contribution to the Lao PDR was obtained from the visitors' expenditure survey results. The tourism primary sectors spending data were extracted from the visitors' expenditure on accommodation, food, retail shopping (groceries), transportation, communication, recreation and miscellaneous categories. These figures were disaggregated from the allocated economic sectors in the Lao PDR national accounts and used to create the tourism sector in the national I-O table.

Step 3: Update of the 2008 Lao PDR I-O table: The RAS method (built in SimSIP SAM Software) was used to update and balance the Lao PDR 2008 I-O table (see Figure 3.1). The Lao PDR 2003 I-O table coefficients were used with the actual outputs and final demand values of the 2008 production sectors from the 2008 Statistical Year Book of the Lao PDR.

Step 4: Data analysis using SimSIP SAM Software: The data in both I-O tables were analysed using the SimSIP SAM software to answer research objectives 1 and 2.

Step 5: Visitors' expenditure behaviour/pattern analysis: Visitors' expenditure behaviour was analysed from the survey questionnaire using SPSS and Excel spreadsheet. The visitors' expenditure data were used in the I-O models to complete the I-O table to generate the tourism sector data. This information affects all three research objectives.

Step 6: Tourism stakeholders' perception analysis: Twenty-two tourism stakeholders were interviewed to obtain the stakeholders' perceptions on the economic impact of tourism on the Lao PDR economy and to assess the tourism sector's problems and obstacles. The interview was conducted in English and transcribed in Word and compiled in Excel to draw the frequencies. The transcribed qualitative information were coded, quantified and grouped with similar contents/themes using Excel. This answers research objective 3.

As shown in Figure 3.1, data related to sector exports and imports, employment, government taxes and revenue, final demand and gross value added were obtained from the Statistical Year Books of 2003 and 2008 from NSC, Lao PDR. Tourism related data were obtained from the 2003 and 2008 Statistical Reports on Tourism in Laos published by the LNTA.

3.3.1 Choice of industry sectors and disaggregation of the tourism sector

There are three broad economic sectors of the Lao PDR namely: agriculture, industry and services. Table 3.4 shows the aggregated economic sectors of the Lao PDR economy while analysing the data. These sectors were defined by National Statistics Centre, Lao PDR and were adopted by the ADB when constructing the I-O table of the country. These sectors were further aggregated into 14 sectors in the national 2003 I-O table to provide comparable analysis. Economic sector aggregation and disaggregation procedures followed UNISIC using the Handbook of Input-Output Table Compilation and Analysis, United Nations, New York, 1999 (United Nations, 1999). The following steps were used while creating the international tourism sector in the Lao PDR economy (United Nations, 1999, p.215):

(a) the components of input and output that belong to the international tourist sector were disaggregated/separated based on visitors' expenditure;

(b) an aggregation of inputs and outputs of the components of the tourist sector; and

(c) the extracted share of the final demand of the tourism sector is equal to the remaining outputs less intermediate consumption.

The United Nations (1999) report pointed out that some economic sectors have no relationship or minimal relationship with the tourism sector either as direct vendors to visitors or as intermediate suppliers described in the national accounts.

Table 3.4 Economic sector aggregations of the Lao PDR.

Sectors in Lao PDR National Accounts		Sectors used in this study	
Agriculture		**Agriculture**	
1.	Crops	1.	Agriculture and livestock (1+2)
2.	Livestock, fisheries and poultry		
3.	Forestry and logging	2.	Forestry and logging (3)
Industry		**Industry**	
4.	Mining and quarrying	3.	Mining and quarrying (4)
5.	Food, beverage and tobacco manufacturing	4.	Food and beverages manufacturing (5)
6.	Textiles, garments and leather products	5.	Other manufacturing (6+7+8+9+10+11)
7.	Wood and paper products; printing		
8.	Chemical products; petroleum		
9.	Non-metallic mineral products		
10.	Metal products, machinery and parts		
11.	Other manufactured goods		
12.	Electricity and water supply	6.	Electricity and water supply (12)
13.	Construction	7.	Construction (13)
Services		**Services**	
14.	Transportation	8.	Transport and communication (14+15)
15.	Postage and telecommunication		
16.	Wholesale and retail trade	9.	Wholesale and retail trade (16)
17.	Banking, finance and insurance	10.	Banking and finance (17)
18.	Real estate and business services	11.	Real estate and business services (18)
19.	Public administration	12.	Public administration (19)
20.	Personal, social and community services	13.	Personal, social and community services (20)
		14	**Tourism***

Note: * The Tourism sector is created as a new sector in Lao PDR economy.

As discussed earlier, tourism is not an economic sector that can be immediately identified in the national I-O tables or in the national accounts of the Lao PDR. Therefore, the tourism sector was disaggregated from the different economic sectors based on the visitors' expenditure survey results and secondary data. These sectors can be aggregated to related sectors while disaggregating the tourism sector from the rest of the economy. The main reason

for aggregating the economic sectors is to emphasize only the tourism related sectors. For example, crop and livestock, fisheries and poultry were aggregated to form agriculture and livestock sector. Similarly, metal, non-metallic and other manufacturing were aggregated into other manufacturing sector. The aggregated economic sectors are also matched with the Lao PDR's national accounts based on the Statistical Year Book of Lao PDR for 2003 and 2008 and visitors' expenditure categories. In the aggregated sectors, there are two sectors in Agriculture, five in Industry and seven in Services (see Table 3.4).

According to United Nations (1999), on the disaggregation of the tourism sector from the national economy, the accommodation expenses were allocated to the real estate and business services and food and beverages expenses to the food and beverages manufacturing and agriculture. Similarly, entertainment and sightseeing were allocated to the personal, community and social services sector; shopping to wholesale and retail trade; and transportation and communication expenditure to the transport and communication sectors. Visa fees went to public administration and miscellaneous expenses were included in the banking and finance and personal, community and social services sectors proportionately (United Nations, 1999). The results obtained from the visitors' expenditure survey across the spending categories were summed with the total international visitor arrivals; average duration of stay and their daily average expenditure. These generated the expenditure by each spending category with the visitors' country of origin and tourism primary sector activities. Summing across the groups and categories and related economic sectors generated the total expenditures in the tourism sector. However, the total gross inputs and outputs of the Lao PDR economy or I-O table for both years (2003 and 2008) remained same.

3.3.2 Input Output model framework for Lao PDR economy

Table 3.5 is the I-O model framework of the Lao PDR economy used in the study. According to Miller and Blair (1985, 2009), the inter-industry flows are measured in a specific time period (generally a year) and in monetary values. The Lao PDR economy is divided into 14 sectors in this study (see Table 3.4). In Table 3.5, the columns of the I-O table (14×14 sectors) are the selling sectors and the rows are the purchasing sectors of the economy. Here, inter-industry flow occurs from products (1.....to.....14) to sectors (1.....to.....14). The sector and product transactions are shown in the product and sector block of the I-O table and the transactions can be derived from the following I-O equations (see Table 3.5):

Table 3.5 Input-Output Model framework of the Lao PDR economy showing 14 economic sectors.

		Sectors					TID	Final Demand					TFD	TO
		1	**2**	**...**	**...**	**14**		**HCE**	**GCE**	**GFCF**	**CI**	**E**		
Products	**1**	$j_{1,1}$	$j_{1,2}$	**...**	**...**	$j_{1,14}$	$\boldsymbol{J_1}$	h_1	g_1	f_1	c_1	e_1	$\boldsymbol{Y_1}$	$\boldsymbol{X_1}$
	2	$j_{2,1}$	$j_{2,2}$	**...**	**...**	$j_{2,14}$	$\boldsymbol{J_2}$	h_2	g_2	f_2	c_2	e_2	$\boldsymbol{Y_2}$	$\boldsymbol{X_2}$
	3	$j_{1,3}$	$j_{2,3}$	**...**	**...**	$j_{3,14}$	$\boldsymbol{J_3}$	h_3	g_3	f_3	c_3	e_3	$\boldsymbol{Y_3}$	$\boldsymbol{X_3}$
	...	**...**	**....**	**...**	**...**	**...**	**...**	**...**	**....**	**...**	**....**	**....**	**...**	**...**
	...	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
	14	$j_{1,14}$	$j_{2,14}$	**...**	**...**	$j_{14,14}$	$\boldsymbol{J_{14}}$	h_{14}	g_{14}	f_{14}	c_{14}	e_{14}	$\boldsymbol{Y_{14}}$	$\boldsymbol{X_{14}}$
TII		$\boldsymbol{J_1}$	$\boldsymbol{J_2}$	**...**	**...**	$\boldsymbol{J_{14}}$		$\boldsymbol{H_{14}}$	$\boldsymbol{G_{14}}$	$\boldsymbol{F_{14}}$	$\boldsymbol{C_{14}}$	$\boldsymbol{E_{14}}$		
Value Added	**CE**	p_1	p_2	**...**	**...**	p_{14}	$\boldsymbol{P_{14}}$							
	PTS	q_1	q_2	**...**	**...**	q_14	$\boldsymbol{Q_{14}}$							
	DEP	r_1	r_2	**...**	**...**	r_{14}	$\boldsymbol{R_{14}}$							
	OS	s_1	s_2	**...**	**...**	s_{14}	$\boldsymbol{S_{14}}$							
	MTX	t_1	t_2	**...**	**...**	t_{14}	$\boldsymbol{T_{14}}$							
	IM	m_1	m_2	**...**	**...**	m_{14}	$\boldsymbol{M_{14}}$							
TVA		$\boldsymbol{V_1}$	$\boldsymbol{V_2}$	**...**	**...**	$\boldsymbol{V_{14}}$								
TI		$\boldsymbol{X_1}$	$\boldsymbol{X_2}$	**...**	**...**	$\boldsymbol{X_{14}}$								

Note: 1, 2, 3....., 14 = Number of economic sectors of Lao PDR (see Appendix 3)

TII = Total Intermediate Inputs

TVA = Total Value Added

TI = Total Inputs

TFD = Total Final Demand

TO = Total Output

TID = Total Intermediate Demand

PTS = Production Taxes and Subsidies

DEP = Depreciation

OS = Operating Surplus

MTX = Import Taxes

HCE = Household Consumption Expenditures

GCE = Government Consumption Expenditures

GFCF = Gross Fixed Capital Formation

CI = Change in Inventories

E = Exports

IM = Imports

CE = Compensation of Employees

For sectors 1 and 2:

$$X_1 = J_{1,1} + J_{1,2} \ldots\ldots\ldots\ldots + J_{1,14} + Y_1 \quad (3.1)$$

$$X_2 = J_{2,1} + J_{2,2} \ldots\ldots\ldots\ldots + J_{2,14} + Y_2 \quad (3.2)$$

Similarly, for sector 14:

$$X_{14} = J_{14,1} + J_{14,2} \ldots\ldots\ldots\ldots + J_{14,14} + Y_{14} \quad (3.3)$$

Where:

X_1, X_2 .....X_{14} = Total output of the sectors 1, 2, ... 14 respectively

Y_1, Y_2 .....Y_{14} = Total final demand of the sectors 1, 2, ... 14 respectively

For the production process, a sector needs to have labour, capital and different inputs and these factors are allocated to the value added block of the I-O table (see Table 3.5). They are compensation for employees (p_1, p_2.....p_{14}); production taxes and subsidies (q_1, q_2.....q_{14}); depreciation (r_1, r_2,.....r_{14}); operating surplus (s_1, s_2, ...s_{14}); import taxes (i_1, i_2, ...i_{14}); and imports (m_1, m_2.....m_{14}).

Similarly, to complete the production process, an economy needs to have expenditure from households and government and exports. They are households consumption expenditure (h_1, h_2,.....h_{14}); government consumption expenditure (g_1, g_2, ...g_{14}); gross fixed capital formation (f_1, f_2, ...f_{14}); change in inventories (c_1, c_2, ...c_{14}); and exports (e_1, e_2, ...e_{14}) (see Table 3.5). These are entered into the final demand block of the I-O table. The assumptions of an I-O model include the flow of product '*i'* to sector '*j'*, which depends on the total output of the sector '*i'* and I-O coefficients. These I-O coefficients can be derived by dividing the inter-industry flows of sector '*i'* by the total output of that sector (Yu et al., 2010).

The I-O coefficients show the amount of input required by the column sector (selling sector) from each of the row sector (purchasing sector) to produce a dollar of output from that column sector (Miller & Blair, 2009). All these data components are entered into SimSIP SAM software and analyzed, which is discussed below (see Appendices 11 and 12).

3.3.3 Application of SimSIP SAM Software

SimSIP SAM stands for Simulations for Social Indicators and Poverty through Social Accounting Matrix. The software is based on a Microsoft Excel application with MATLAB running in the background that can be used to analyse I-O tables and SAM (Parra & Wodon, 2008). The software was developed in 2008 by J. C. Parra and Q. Wodon of the World Bank

and the revised version 1.1.1 became available in 2010. The software can be used to automate and enhance the analysis of I-O and SAM models. Both quantity and price models can be analysed by the software; this study used the price model.

The application is useful to perform several types of analysis such as aggregation (re-composition), disaggregation (decomposition), updating and balancing of the I-O tables to obtain descriptive and analytical results of an economy. Previous studies using the software include Parra and Wodon (2009) for Tanzania; Fofana, Parra and Wodon (2009) for Senegal; and Nganou, Parra and Wodon (2009) for Kenya.

The initial step in using the I-O model with SimSIP SAM software is to identify the endogenous and exogenous accounts of the economy. According to Sadoulet and de Janvry (2003, cited in Parra & Wodon, 2008), exogenous accounts are those for which the expenditure is set independently of income and endogenous accounts are those that change the level of expenditure following any change in income. Therefore, the software applications consider the government, capital and rest of the world (exports and imports) accounts as exogenous accounts and all other accounts as endogenous.

In the Lao PDR I-O tables, there were five endogenous sectors for the value added category (compensation of employees, production tax less subsidies, depreciation, operating surplus, import tax), four exogenous sectors for the final demand categories (household consumption expenditures, government consumption expenditures, gross fixed capital formation and changes in inventories), two for the rest of the world (exports and imports) and one residual account, which is exogenous by default. Each cell in the I-O table is expressed in price or value terms. One of the three important assumptions of the I-O analysis is that the model assumes that prices are fixed for homogenous commodities. The SimSIP SAM software application is divided into several analysis components/blocks suitable for I-O and SAM analyses out of which four analysis blocks were used in this study. These are (see Appendices 11 and 12):

Matrix design, update and balance I-O table: The block defines the matrix (number of sectors, endogenous and exogenous accounts), balancing and updating matrices, aggregation and disaggregation of economic sectors.

GDP, Value added and sector multiplier analysis: The block is used to calculate sector GDP, economic multiplier analysis and sector income and expenditure analysis. Further, the block

also computes the technical coefficients, Leontief Inverse/I-O (SAM) Matrix, and the total economic impact (direct, indirect and induced effects) of the different economic sectors.

Sector impact, inter-industry linkages and key sector analyses: This block estimates the sector impact of economic activities and different types of linkages and interdependency analysis such as standard, pure and weighted backward and forward linkages. This section also computes the key sectors of an economy based on the inter-industry linkages.

Structural change of an economy: This block provides a proportional change in the I-O coefficients between two time periods. The economic landscape shows the imposed linkage hierarchies (in a graph) from the I-O MPM for 2003 and 2008 in this study.

Based on these provisions and the requirements of the SimSIP SAM software, the data for both years (2003 and 2008) were entered into the software to generate the results (see Appendices 11 and 12).

3.3.4 Updating the Lao PDR 2008 I-O table

The RAS method was used to update the coefficients of the Lao PDR 2008 I-O table. In the RAS method, '*R'* is the row coefficient (provides substitution effects of the product) and '*S'* is the column coefficient (provides fabrication effects of the product) and '*A'* is the I-O coefficient of the base year (United Nations, 1999). As discussed earlier, the I-O coefficients of 2003 of the Lao PDR were used to update the I-O table for 2008 as per the requirements and the table was balanced using the SimSIP SAM software. The RAS method is widely used because of its simplicity and need for fewer details of the data compared with other I-O table updating methods (Parra & Wodon, 2008). The method is described as follows:

R×A×S = Row coefficient (R) × Total output/input (X_1) × Column coefficient (S)

Steps in updating the Input Output table using RAS method

The basic I-O model is (Archer & Fletcher, 1996):

$$X = (I - A)^{-1} \times Y \qquad (3.4)$$

Replace $(I - A)^{-1}$ with '*L'*, where '*L'* is the Leontief Inverse.

Then equation (3.4) becomes, $X = L \times Y$ (3.5)

Where '*X'* is the vector of production, '*Y'* is the vector of final demand, '*I'* is the identity matrix and '*A'* is the production coefficient matrix (Archer, 1995).

The RAS method generates a new I-O coefficient A^{2008} from the base year coefficient A^{2003} by means of 'bi-proportional' row (updated year's gross outputs) and column operations (updated year's gross inputs) in this study.

$$A_{ij}^{*} = R_i \times A_{ij} \times S_j \qquad (3.6)$$

Where:

A_{ij}^{*}= I-O coefficient for the updated year;

R_i= Row total for the updated year;

A_{ij}= I-O coefficient for the base year; and

S_j= Column total of the updated year.

The 20-sector Lao PDR I-O table for 2003 is available from the ADB and we needed to update the 2008 table. Let A^{2003} be the original 2003 I-O table, and Y^{2003} and P^{2003} be the row and column totals, respectively. Let Y^{2008} and P^{2008} be the desired row and column totals for 2008. As discussed earlier, we use 14 economic sectors in both I-O tables (2003 and 2008) after aggregation and disaggregation of the sectors. The updated 2008 I-O table derived from the following procedures (adopted and modified from Central Statistics Office, 2006):

$$R^{2008} = \begin{bmatrix} \frac{Y_1^{2008}}{Y_1^{2003}} & \cdots 0 \ldots 0 \ldots 0 \ldots 0 \ldots 0 \ldots 0 \ldots & 0 \\ \vdots & \ddots & \vdots \\ 0 & 0 \cdots 0 \ldots 0 \ldots 0 \ldots 0 \ldots 0 & \frac{Y_{14}^{2008}}{Y_{14}^{2003}} \end{bmatrix} \qquad (3.7)$$

N = 14, Number of economic sectors in the Lao PDR economy (1, 2, 3,.....to 14)

$$S^{2008} = \begin{bmatrix} \frac{P_1^{2008}}{P_1^{2003}} & \cdots 0 \ldots 0 \ldots 0 \ldots 0 \ldots 0 \ldots 0 \ldots & 0 \\ \vdots & \ddots & \vdots \\ 0 & 0 \cdots 0 \ldots 0 \ldots 0 \ldots 0 \ldots 0 & \frac{P_{14}^{2008}}{P_{14}^{2003}} \end{bmatrix} \qquad (3.8)$$

Next, we obtained the following (Central Statistics Office, 2006):

$$B^{2008} = R^{2008} \times A^{2003} \qquad (3.9)$$

$$A^{2008} = B^{2008} \times S^{2008} \qquad (3.10)$$

Equations (3.9) and (3.10) were computed over a number of iterations until the ratio of column totals and row totals obtained were of equal values for the Lao PDR 2008 I-O table (see Appendix 10). These iterations were computed with the help of SimSIP SAM Software, which also shows the number of iterations to balance the I-O table. An I-O table is said to be balanced if the sums of the matching rows and columns are equal (Parra & Wodon, 2008).

3.4 Estimation of tourism economic multipliers

Baaijens, Nijkamp and Van Montfort (1998, p.16) argued that multipliers calculated by an ad-hoc approach such as Archer (1977) appeared to have smaller values than those computed by the I-O model. The I-O model gives a better conclusion in calculating the multiplier because the models map out the economy more completely (Stynes, 1997). Chhabra (2001, p.98) reported that a tourism economic multiplier of the total economic impact in the region attributable to a dollar of visitors' expenditure adds up all the transactions initiated by that expenditure. Tourism multipliers were computed as the weighted average of the multipliers for the primary tourism sectors based on the visitors' expenditure survey results in this study. Table 3.6 shows the aggregated seven primary tourism sectors in the Lao PDR economy that were used in this study. On average, the visitors' expenditure on accommodation was 30 percent while 25 percent was on food and beverages of their total expenditure in Lao PDR. Similarly, about 13 percent was spent on groceries and manufacturing goods, about 16 percent on sightseeing, entertainment and recreation, and about five percent on local transportation.

The visitors spent about four percent on communications and six percent on visa fees and miscellaneous expenses. In order to have fewer primary tourism sectors in the analysis, the visa fee expenses were included in the miscellaneous expenses of the visitors' expenditure for the broad classifications of the visitors' primary sectors' expenditure. The imports were obtained from the 2008 Statistical Report on Tourism in the Lao PDR and were deducted from the tourism outputs in computing the results. The tourism activities considered in this research are: a) accommodation, b) food and beverages, c) local transportation, d) retail shopping, e) communications, f) entertainment, and g) miscellaneous (see Table 3.6).

Table 3.6 Aggregation of primary tourism sectors in the Lao PDR.

Primary tourism activities/sectors	Percentage of direct sales	Amount (m US$)	Percentage of expenditure*	Amount (m US$)*
Accommodations	30.41	83.79	17.2	47.39
Food and beverages	25.36	69.87	14.4	39.67
Retail shopping	13.27	36.57	7.5	20.66
Local transportation	4.81	13.26	2.7	7.44
Sightseeing and entertainment	15.9	43.94	9.0	24.80
Communications	3.90	10.75	2.2	6.06
Miscellaneous and visa fees	6.29	17.33	3.6	9.92
Tourism imports	-	-	43.4	119.57
Total	**100.0**	**275.5**	**100.0**	**275.5**

Source: Visitors' Expenditure Survey Results 2009
Note: * The figures exclude tourism imports and shows the actual amounts retained in the economy.

The economic multipliers are generally derived from the inverse coefficients of the total requirement table or I-O table (Miller & Blair, 1985, 2009). In other words, the multiplier coefficients are simply the column sum of the Leontief Inverse or I-O matrix (Archer, 1995). The I-O coefficient shows the input requirements of a unit increase in the final demand for a given sector. The average visitor's expenditure by spending categories has been allocated to the relevant economic sectors of the I-O categories taken from the 14×14 economic sectors. In this study, each multiplier was separately assessed for its direct, indirect and induced impact. The derived multipliers were employed in the SimSIP SAM software to estimate the tourism economic multipliers and the total economic impact of tourism on the economy.

The tourism multipliers were computed as weighted averages of the multipliers for the seven primary tourism sectors, or activities, in proportion to the percentage of the direct sales to the different sectors in the country's economy (see Table 3.6). It is recognized that tourism's economic benefits to host countries may be less than what they are considered to be because they entail costs such as increased imports, dependence on foreign capital and income leakage (Briassoulis, 1991, p.485). For example, imports of tourism products and income earned by foreign employees in the tourism sector both substitute for domestic production and are included in the output multipliers calculations in the I-O model in this study. Based on the visitors' expenditure, this study developed a model for tourism economic multiplier analysis of the Lao PDR as follows (adapted and modified from Chang, 2001, p.57):

$$Overall\ Tourism\ Multiplier\ (OTM) = 0.172 \times Accommodation + 0.144 \times Food\ and\ beverages + 0.075 \times Retail\ shopping + 0.090 \times Sightseeing\ and\ entertainment + 0.027\ Local\ Transportation + 0.022 \times Communications + 0.036 \times Miscellaneous + 0.434 \times Imports \quad (3.11)$$

This study uses the I-O multiplier approach to measure the impact of the economic sectors on the Lao PDR. Normal (direct, indirect and induced impacts) and ratio (Type I and Type II) multipliers were calculated for all primary tourism sectors as shown in Table 3.7. In this study output, income, value added, employment and imports multipliers of the tourism sector were calculated as normal multipliers. The impact assessment focuses on derived ratio multipliers as measures of normal multipliers from a change in the final demand of the economic sectors in 2008 in the country (see Table 3.7). The ratio multipliers, and Type I and Type II multipliers, were computed as follows.

Table 3.7 Normal and ratio economic multipliers.

Economic measures and	Output	Income	Value Added (VA)	Employment
Direct impacts ratio	-	direct income/ direct sales	direct VA/ direct sales	direct jobs/ direct sales
Type I multipliers	direct + indirect sales/direct sales	-	-	-
Type II multipliers	total sales/direct sales	total income/ direct sales	total VA/ direct sales	total jobs/ direct sales

Note: Total impacts = direct + indirect + induced impacts and VA = Value Added
Source: Chang (2001, p.54)

Type I and Type II multipliers: The multipliers coefficient (column sum of Leontief Inverse, see Appendices 8 and 9) is the type I multiplier for a given sector, which gives the direct impact (Chang, 2001). The Type II multiplier incorporates the impact of employees' income into the I-O model to estimate the induced impacts (Chang, 2001). This requires creating the household consumption sector (n+1) as an additional sector (14+1=15 sectors) and employee income (compensation of employee: n+1) in a row (14+1=15 sectors) of the I-O table. The next step is to calculate the I-O coefficients matrix from the new I-O table using the same procedure. The formula for deriving the new I-O coefficients is as follows (Tantirigama & Taniguchi-Singh, 2009, p.17):

$$a\ (n+1, n+1) = \frac{A\ (n+1, n+1)}{Q\ (1, n+1)} \qquad (3.12)$$

Where:

$a\ (n+1, n+1)$ = I-O coefficient matrix with an additional row of compensation of employees and an additional column of household consumption expenditure;
$A\ (n+1, n+1)$ = new inter-industry transaction table; and
$Q\ (1, n+1)$ = new gross outputs of the particular sector.

The next step is to derive the new I-O coefficients and the economic multipliers using the same procedures with SimSIP SAM Software.

3.4.1 Derivation of multipliers of the seven primary tourism sector activities

This section describes the methods used to derive the tourism economic multipliers from the I-O model. Based on the seven primary tourism sectors estimated in the visitors' expenditure in the Lao PDR, the tourism economic multipliers have been computed for this study. These are: output, income, employment, value added and imports multipliers. The method used to compute the tourism' primary sectors specific multiplier was the I-O model with household

consumption expenditure as an exogenous account while entering the data in the SimSIP SAM software (see Appendix 11). The methods to compute the tourism multipliers are discussed below.

3.4.1.1 Output multiplier

The output multiplier of the seven primary tourism sectors of the Lao PDR economy were calculated as follows (adapted and modifed from Mazumder et al., 2009, p.150):

$$OM_{1\times7} = Y_{1\times7} \times (I - A)^{-1}_{7\times7} \quad (3.13)$$

Where:

$OM_{1\times7}$ = the vector of output multiplier for the seven primary tourism sectors in the economy;

$(I - A)^{-1}_{7\times7}$ = the total economic impacts including direct, indirect and induced requirement matrix (I-O matrix);

$Y_{1\times7}$ = the vector of final demand; and

1,……7 = the number of primary tourism sectors used in this study.

3.4.1.2 Income multiplier

The income multiplier measures the change in income (salaries, wages and profits) in the economy as a result of a change in final demand (Miller & Blair, 1985, 2009). Income multipliers of the seven primary tourism sectors of the Lao PDR economy were computed as follows (adapted and modified from Mazumder et al., 2009, p.150):

$$IM_{1\times7} = (H_{1\times7} / X_{1\times7}) \times (I - A)^{-1}_{7\times7} \quad (3.14)$$

Where:

$IM_{1\times7}$= the vector of income multiplier for the seven primary tourism sectors in the economy;

$H_{1\times7}$ = the vector of household income for the seven primary tourism sectors in million US$; and

$X_{1\times7}$ = the vector of gross output of seven primary tourism sectors in million US$.

3.4.1.3 Value added multiplier

Value added multipliers of the seven primary tourism sectors of the Lao PDR economy were derived as follows (adapted and modified from Mazumder et al., 2009, p.150):

$$VA_{1\times7} = (V_{1\times7} / X_{1\times7}) \times (I - A)^{-1}_{7\times7} \quad (3.15)$$

Where:

$VA_{1\times7}$ = the vector of the value added multiplier for the seven primary tourism sectors in the economy;

$V_{1\times7}$ = the vector of the value added for the seven primary tourism sectors expressed in million US$; and

$X_{1\times7}$ = the vector of the gross output of the seven primary tourism sectors in million US$.

3.4.1.4 Employment multiplier

The employment multipliers of the seven primary tourism sectors of the Lao PDR economy were derived as follows (adapted and modified from Mazumder et al., 2009, p.150):

$$E_{1\times7} = (e_{1\times7} \,/\, X_{1\times7}) \times (I - A)^{-1}_{7\times7} \qquad (3.16)$$

Where:

$X_{1\times7}$ = the vector of the gross output of the seven primary tourism sectors in million US$;

$E_{1\times7}$ = the vector of the employment multiplier for the seven primary tourism sectors in the economy; and

$e_{1\times7}$ = the vector of the full-time employees for the seven primary tourism sectors expressed in person-years.

3.4.1.5 Imports multiplier

The imports multipliers of the seven primary tourism sectors of the Lao PDR economy were derived as follows (adapted and modified from Mazumder et al., 2009, p.151):

$$IMM_{1\times7} = (M_{1\times7} \,/\, X_{1\times7}) \times (I - A)^{-1}_{7\times7} \qquad (3.17)$$

Where:

$IMM_{1\times7}$ = the vector of the import multiplier for the seven primary tourism sectors in the economy;

$M_{1\times7}$ = the vector of the imports for the seven primary tourism sectors expressed in million US$; and

$X_{1\times7}$ = the vector of gross output of the seven primary tourism sectors in million US$.

3.4.2 Total economic impact analysis of the tourism sector

A standard economic impact analysis traces flows of money from the visitors' expenditure to business by supplying goods and tourist businesses; households earning income by working in tourism and supporting industries and government through various taxes and charges on tourist businesses and households (Stynes, 1997). The impact can be computed in different stages of the visitors' expenditure such as direct, indirect and induced impacts of the tourism sector. The following section describes the calculation of these impacts in this study.

3.4.2.1 Direct impact

Direct impact is the effect of the visitors' primary economic activities and reveal the inter-industry linkages that tie the economy together; the first round of an economic effect (Archer, 1995). These include changes in industries associated directly with the visitors' expenditure such as payments to hotels, restaurants, retail stores, phone, and internet. Direct impact is calculated as the sum of the total column vector of the respective I-O table (Jones, 1997) (see Appendices 6 and 7).

3.4.2.2 Indirect impact

Indirect impact is the effect of the secondary economic activities that are needed to make the primary economic activities possible (Archer, 1995). Indirect effects are sales, income or jobs resulting from various rounds of the purchases the hotel made to other "backward linked" industries such as primary sector purchases for food, manufacturing, linen and handicrafts industries. (Stynes, 1997). In the second round, the total output of the economy stimulated by the original increase of final demand of the particular sector of a dollar is the sum of the first and second round effects. The indirect impact is calculated by multiplying each sector's direct effect by its respective column elements derived from the respective I-O table and summing the products (Jones, 1997) (see Appendices 6 and 7).

3.4.2.3 Induced impact

Induced impact is the effect caused by re-spending of the income earned from tourism (Stynes, 1997). The author claimed that induced effects are sales, income and jobs resulting from household spending of the income earned as a result of the visitors' expenditure either directly or indirectly. For example, employees of hotels, linen suppliers, and utility companies re-spend their income earned from these sectors in the local economy. The induced impact is calculated by multiplying both the direct and indirect impact by their respective column elements derived from the respective I-O tables and summing the products (Jones, 1997) (see Appendices 6 and 7).

3.5 Inter-industry linkage analysis of tourism sector

The Rasmussen-Hirschman and Chenery-Watanabe inter-industry linkage analysis approaches outlined the computation of the backward and forward linkages indices that indicate the importance of an economic sector in terms of its impact on the whole system. These approaches consider only linkage effects without any consideration of the level of production in each sector (Sonis et al., 1995). Using only this output may result in misleading interpretation because a sector can be identified as a key sector due to its higher backward and forward linkages. For example, the economic sector may have a small volume of production,

ultimately contributing less to the total economy and the sector with weak backward forward linkages might have a large volume of production and contribute more to the country's economy in absolute terms (Bonet, 2005). Sonis and Hewings (1989) and Sonis et al. (1995) further modified the linkage analysis approach making these calculations more reliable with wider applicability to verify how the influence of each sector is distributed over the different sectors of the economy, which is also called the I-O MPM.

Sonis et al. (1995) suggested that the Rasmussen-Hirschman index, weighted linkage, pure linkage and I-O MPM must be combined in order to have a complete picture of the structural changes in the economy. The above-mentioned inter-industry linkage measures were analysed using SimSIP SAM Software to obtain reliable and widely applicable results for the linkages and key sector analyses of the Lao PDR economy in this study.

3.5.1 Computation of the backward and forward linkages

A backward linkage shows the amount a sector demands from other economic sectors, whereas a forward linkage shows how much an economic sector is demanded by the different economic sectors (Parré et al., 2002). In terms of percentage, the backward linkage of a sector quantifies the change in economy-wide income, relative to the average in the economy, caused by a unitary injection in the final demand of that particular sector (Parra & Wodon, 2008, p.61). The sector with the higher value for backward linkages represents the sector with the higher impact on the demand for domestic production (Drejer, 2003). The standard backward and forward linkages in this study are estimated as follows (Rasmussen-Hirschman modified formulae in Bonet, 2005; Parré et al., 2002; Sonis et al., 1995):

$$BL = (Uj) = \frac{b.j / n}{(I - A)^{-1}} \tag{3.18}$$

$$FL = (Ui) = \frac{bi./ n}{(I - A)^{-1}} \tag{3.19}$$

Where:

U_j = BL = Backward Linkage Index;

Ui = FL = Forward Linkage Index;

$(I\text{-}A)^{-1}$ = Leontief Inverse Matrix;

b_j = Column sums of Leontief Inverse Matrix;

b_i = Row sums of Leontief Inverse Matrix;

$b_.$ = Total sums of the Leontief Inverse Matrix; and

n = Number of Economic Sectors in the matrix.

3.5.2 Computation of the total linkages

The total direct linkages represent the capacity of the corresponding services to induce and to be induced with respect to the production activity in the economy (Sharma, 2002). In other words, the total linkages represent both the direct and indirect capacity of the services to increase economic activity throughout the economy, following an increase in their own demand (Azad, 1999). Total direct linkages were obtained in this study by adding the backward and forward linkages as follows (Sonis et al., 1995):

$$TIL = TBL + TFL \tag{3.20}$$

Where:

TIL = Total Inter-industry Linkages;

TBL = Total Backward Linkages; and

TFL = Total Forward Linkages.

3.5.3 Computation of the pure linkage indices

The economic interdependence and linkages analysis by the standard backward and forward linkage approach have become less appropriate tools for identifying core relations in the economic system (Sonis et al., 1995). The authors further reported that the pure linkage method overcomes the limitation of standard linkages analysis by incorporating the level of production in the identification of key sectors of an economy. There have been some studies on pure linkages computation during 1990s and early 2000s and the methodologies for computing these linkages were followed in this study and are discussed below.

Guilhoto, Hewings and Sonis (1997) reported that the pure linkage index of forward, backward and total inter-industry linkages measures the importance of a given sector for the rest of the economy in terms of its total output value. The pure backward and forward linkages take into account monetary values. These monetary values are allocated based on the weight factors of the sector's linkage power in the economy. The implications of the pure backward and forward linkages are different from the Rasmussen-Hirschman and Chenery-Watanabe linkages analysis approaches. Pure Backward Linkage (PBL) and Pure Forward Linkage (PFL) are derived as follows (Bonet, 2005; Sonis et al., 1995; Sonis et al., 2000):

$$PBL = \Delta_r A_{rj} \Delta_j Y_j \tag{3.21}$$

$$PFL = \Delta_j A_{jr} \Delta_r Y_r \tag{3.22}$$

Where:

A_{jj} = Squared matrixes of direct inputs of sector '*j';*

A_{rr} = Squared matrixes of direct inputs of the rest of the economy (total minus sector '*j*');

A_{rj} = Direct inputs bought by the sector '*j*' from the rest of the economy;

A_{jr} = Direct inputs bought by the rest of the economy from sector '*j*';

Y_j = Total output of sector '*j*';

Y_r = Total output of the rest of the economy;

Δ_r = Changes in output of the rest of the economy; and

Δ_j = Changes in output of sector '*j*'.

The PBL is the pure impact of the total output value of sector '*j*' over the rest of the economy $(\Delta_j Y_j)$. The PBL of a sector shows an impact that is free from input demand from sector '*j*' itself but is based on the feedback of the rest of the economy to sector '*j*' (Sonis et al., 1995).

The PFL is the pure impact of the total output value of the rest of the economy over sector '*j*', $(\Delta_r Y_r)$. The PBL and PFL are expressed in monetary values and the Pure Total Linkage (PTL) of each sector in the economy were be obtained by summing PBL and PFL (Bonet, 2005, p.20). Hence (Sonis et al., 1995; Sonis et al., 2000):

$$PTL = PBL + PFL \qquad (3.23)$$

The values of pure linkages may be normalized by the average value of the economy's sectors in such a way that the values indicate the number of times a given sector is more or less important than the average of all sectors of the economy (Parré et al., 2002). The authors mentioned that pure linkage indices may be used for a direct comparison of the relative importance of the economy's sectors with volume of production and currency values. Under the PTL approach, those sectors with the largest PTL values are considered key sectors of the economy. The pure linkage index measures the extent to which the production activity of a sector affects the output of other sectors (Andreosso O'Callaghan & Yue, 2004). For example, in the case of the tourism sector, it indicates the total output driven by the tourism sector as pure linkages with different economic sectors, which excludes the impact of the tourism itself.

3.5.4 Computation of the weighted linkage indices

Leoncini et al. (1996) and During and Schnabl (2000) followed Cuello, Mansouri and Hewings (1992) work on weighted linkages and proposed estimation procedures in the I-O model to measure of the economy-wide importance of key sectors. The weighted linkage concept uses the relative importance of final demand and total sector output as weights while estimating the linkages of economic sectors. For forward linkages, it will depend on the level of supply for inputs. The weighted linkages were calculated as (Drejer, 2003):

$$Weighted\ Backward\ Linkages\ (U_{rj}) = \frac{\frac{1}{n}\sum_{i}^{n} r_i b_{ij}}{\frac{1}{n^2}\sum i \sum_j r_i b_{ij}} \quad (3.24)$$

$$Weighted\ Forward\ Linkages\ (U_{ri}) = \frac{\frac{1}{n}\sum_j r_j b_{ij}^*}{\frac{1}{n^2}\sum i \sum_j r_j b_{ij}^*} \quad (3.25)$$

Where:

$n =$ Total number of economic sectors;

$r =$ Weight allocated to the economic sector;

$1/n\ and\ 1/n^2 =$ Weight allocated to the economic sector

$\sum_j b_{ij} =$ Sum of the row of elements of Leontief Inverse;

$\sum_i b_{ij} =$ Sum of the column elements of the Leontief Inverse; and

$\sum_i \sum_j b_{ij}^* =$ Sum of the overall elements of Leontief Inverse.

3.5.5 Computation of the I-O multiplier product matrix

The methods of linkage analysis derived by Hewings et al. (1998) and Sonis et al. (2000) are based on MPM and are associated with the economic landscape, which enables us to visualize the relevant country's economic structure (Drejer, 2003). An I-O MPM provides a quantitative measure of the relationships among the economic sectors; the sectors can be put in order of hierarchy based on their linkage strengths (Parré et al., 2002). In the MPM, the row value shows the hierarchy of forward linkages and the column value shows the hierarchy of backward linkages of the economy. It is easy, for comparison purposes, to see that the sectors in the first column of the matrix are those with the higher backward linkages and sectors in the first row of the matrix have the greater forward linkages in the economy (Bonet, 2005). The MPM from the I-O tables are estimated as follows (Hewings et al., 1998):

$$MPM = A = \left\| a_{ij} \right\| \quad (3.26)$$

$$MPM = B = \left\| b_{ij} \right\| \quad (3.27)$$

The results can be shown in graphical form that shows the sector relationships called an economic landscape. The economic landscape explains the sector structure of an economy with both backward and forward linkages hierarchies (Parra & Wodon, 2008). This reveals how the Lao PDR economy structure has changed and provides us with comparable results that assist us to visualize the economic structure in the two different years in this study.

The MPM properties are analysed in the context of the hierarchy of the backward and forward linkages and their economic landscape associated with the cross structure of the MPM (Bonet,

2005). This means it has a cross structure, one row and one column, which can be arranged in descending order, to find larger forward and backward linkages. The descending economic landscape can be obtained by arranging all the crosses in descending order from larger to smaller using the SimSIP SAM Software (Parra & Wodon, 2008).

3.5.6 Self sufficiency rate analysis of economic sectors

Self Sufficient Rates (SSR) is defined as the ratio of total production to the total domestic demand (Asra et al., 2006). The total domestic demand for a sector is estimated as the sum of intermediate and final demand less exports. Then imports are deducted from the total gross output to obtain gross domestic output in the country (Blake, 2005).

The SSR can be expressed in the following equation (Asra et al., 2006, p.25):

$$SSR_j = {}^{X_j}\big/_{TLD_j} \qquad (3.28)$$

Where:

SSR_j = Self sufficiency rate of sector '*j*';

X_j = Gross domestic output of the sector '*j*'; and

TLD_j = Total domestic demand of the sector '*j*'.

An economic sector with SSR ≥ 1 means that its output is self sufficient to sustain its local demand. If the SSR < 1, then the economic sector is considered an import oriented sector that relies on imports of goods and services to meet the country's total domestic demand (Asra et al., 2006). Tourism and different economic sectors' SSRs of the Lao PDR economy were computed using equation (3.28).

3.5.7 Key sector identification

Key sector identification is also an important indicator of inter-industry linkages analysis. A sector is considered an economy's key-sector if it has at least one of its backward and forward linkage indices greater than one (Parra & Wodon, 2008). Similarly, Andreosso-O'Callghan and Yue (2004) reported that if the values of both the backward and forward linkages indices of a sector are above the corresponding averages, the sector is called a key sector.

In this study, the 14 economic sectors of the Lao PDR were divided into four sub groups based on their degrees of interdependence such as high and low backward and forward linkages, pure linkages, and weighted linkages. For example, group 'I' includes sectors with high degrees of interdependence with sectors having both strong forward and backward linkages. Group 'II' includes the sectors with high forward but low backward linkages and

group ‘III’ is sectors with low forward linkages with high backward linkages. Finally, group ‘IV’ is sectors with weak backward and forward linkages.

This research used the Multi Rank Index (MRI) approach developed by Kweka et al. (2001; 2003) for Tanzania to identify key sectors of the Lao PDR economy. The MRI approach gives a new dimension and consistent results on identifying the key sectors of an economy (Kweka et al., 2001). As per the requirement of the MRI approach, a new value was assigned to economic multipliers and inter-industry linkage indicators such as output multiplier, employment multiplier, GDP contribution, standard linkage, pure linkage, weighted linkage, and self sufficiency rate of all 14 economic sectors of Lao PDR based on their rankings. The new values were assigned as follows: the first five sectors were assigned the value of three, the second five sectors were assigned the value two and the third four sectors were assigned the value one. After summing and averaging these values for all 14 economic sectors of the Lao PDR, the sectors receiving highest average scores were identified as key sectors (first five sectors), average sectors (second five sectors) and weak sectors (third four sectors).

While identifying key sectors, Kweka et al. (2001, 2003) used average linkages and their frequency values in key sectors where half of the sectors were key sectors and remaining sectors were weak sectors. In our study, we used three categories in deriving key sectors using the MRI approach. These included the first 33 percent sectors as key sectors, second 33 percent sectors as average performing sectors and remaining 33 percent sectors as the weak sectors. This method provides a clear distinction between key sectors and weak sectors, and a more consistent and different way of interpreting key sectors.

3.6 Chapter summary

The chapter discusses the data and methodology used in this study. The data collection procedures include international visitors’ expenditure survey, tourism stakeholders’ interview and secondary data. A total of 417 international visitors were surveyed for the expenditure estimates and 22 tourism stakeholders were interviewed to obtain their perceptions on the economic impact of tourism on Lao PDR economy. The 14 sectors’ 2003 I-O table was constructed including the tourism sector and the 2008 I-O table was updated using the RAS method and SimSIP SAM Software. The estimation methods of the tourism sector’s economic multipliers and total economic impact were compared and evaluated. The approaches for deriving inter-industry linkages such as standard backward and forward linkages, pure linkage, weighted linkage, I-O MPM approach, SSR analysis and key sectors identification

were formulated and discussed. The Kweka et al. (2001) method, the MRI approach is used to identify the overall key sector in the Lao PDR economy.

Overall, despite the limitations presented by the United Nations (1999) and Briassoulis (1991) studies, the I-O analysis has remained the "workhorse" model in measuring the economic impact of a sector in an economy (Lindberg, 2011). In addition, Zhou, Yanagida, Chakravorty and Leung (1997) applied both I-O analysis and CGE analysis to the Hawaiian economy and showed that both methods identified the same industries as being are related to tourism. Together with the visitors' expenditure survey and the availability of secondary data that are compatible with the Lao PDR national accounts, the mixed or hybrid approach of the I-O model is used to derive the economic impact of the tourism sector on the Lao PDR economy.

Chapter 4
Descriptive Statistics and Tourism Economic Multipliers: Results and Discussion

This chapter presents and discusses the results from the international visitors' expenditure survey, the I-O models and the estimated total tourism economic impact using economic multipliers on different economic sectors in the Lao PDR economy. The chapter is organized as follows: Section 4.1 presents the demographic and socio-economic characteristics of the respondents and Section 4.2 illustrates the visitors' countries of origin and expenditure behaviour in Lao PDR primary tourism sector activities. Section 4.3 discusses the impacts of tourism sector's macro-economic indicators on the Lao PDR economy for 2003 and 2008. Section 4.4 presents the estimated normal and ratio multipliers for all Lao PDR primary tourism sectors for 2008, employment and output projection and the total economic impact of tourism for both years of the study periods. Section 4.5 summarizes the results and findings.

4.1 Demographic and socio-economic characteristics of the respondents

The expenditure survey included demographic and socio-economic data such as gender, age, marital status, occupation, gross income, duration of stay, frequency of visit and the nationalities of the international visitors. The expenditure values obtained from the survey were used in the I-O models. The other variables were used to recommend the day to day business operational decisions for the tourism stakeholders in the country. Tables 4.1 and 4.2 show the demographic and socio-economic characteristics of the surveyed respondents in 2009 in Lao PDR. The results showed 44 percent of the respondents were female and 56 percent were male. The majority of respondents were visiting the Lao PDR for 4-6 days/visit. The greatest proportion of the respondents (49%) was between 31-45 years old followed by 45-60 years old (26%). Twenty percent of the respondents were between 18-30 years old and five percent of the respondents were over 60 years old (see Table 4.1). The study results show that more young female visitors travelled to the Lao PDR than males, aged between 18-30 years old.

Twenty seven percent of the respondents said that their main occupation was education and research professional followed by business people (25%), government workers (22%), self employed (19%), retired (8%) and housewife (4%) respectively. The results showed that the majority of the respondents to the Lao PDR were business people, educationalists and public

service workers. Similarly, majority of the respondents to the Lao PDR were married (62%) at the time of survey followed by single or never married (26%). There were eight percent respondents in de-facto relationships and three percent of respondents were divorced from their spouses.

Table 4.1 Demographic characteristics of the surveyed respondents (international visitors to the Lao PDR) in 2009.

Profile	Characteristics	Frequency	Percentage (n=417)
Gender	Male	234	56.1
	Female	183	43.9
Age	18-30 year	83	19.9
	31-45 year	205	49.2
	46-60 year	109	26.1
	> 60 year	20	4.8
Marital status	Single or never married	109	26.1
	Married	257	61.6
	De facto relationship	35	8.4
	Divorce or separated	14	3.4
Occupation	Farming	24	5.8
	Education professional	114	27.3
	Government workers	91	21.8
	Businessperson	106	25.4
	Unemployed	28	6.7
	Student	35	8.4
	Retired	15	3.6
	Sports person	3	0.7
Monthly gross income	Less than US$1,000	71	17.0
	Between US$1,001-2,000	112	26.9
	Between US$2,001-3,000	82	19.7
	Between US$3,001-4,000	78	18.7
	More than US$4,000	74	17.7
Travelling with	Alone	111	26.6
	Spouse/partner	195	46.8
	Children	46	11.0
	Relatives	53	12.7
	Friends and associates	123	29.5
Number of visits	First	202	48.5
	Second	74	17.7
	Third	53	12.7
	Four	40	9.6
	Five and more	48	11.5

Source: Visitors' expenditure survey, 2009

The results showed that more married people were interested in visiting the Lao PDR. About 47 percent of the respondents accompanied their spouse while visiting the Lao PDR in 2009 (see Table 4.1). Conversely, 27 percent of the respondents visited the country alone. The results suggested that about 19 percent of the respondents have monthly gross income between US$3,001-4,000. Nearly 27 percent of the respondents' gross incomes fell in the range between US$1,001-2,000 per month followed by US$2,001-3,000 per month (20%).

In terms of the frequency of visits, the results showed that 52 percent of the respondents made multiple visits to the country; 48 percent of the respondents visited for the first time. The survey results showed that 12 percent of the respondents made multiple visits, more than five times (see Table 4.1). Both male and female respondents had similar trends in visiting the country up to the third visit but after the fourth visit, male visitors were more likely to have a higher number of visits.

Sixty three percent of the respondents entered the Lao PDR using land transport (mainly by cars and buses); seven percent of the arrivals were by train. About 35 percent of the respondents chose to travel by air and two percent chose a boat to enter the country. The results showed 23 percent of the respondents used their own vehicle to enter the Lao PDR from neighbouring countries such as Thailand, Vietnam and China (see Table 4.2).

International visitors visiting the Lao PDR as single day visitors contributed eight percent of the total arrivals (see Table 4.2). Among them, 65 percent visited the Lao PDR for business purposes followed by those in transit to and from other countries (24%). The survey results also revealed 13 percent of the respondents travelled to the Lao PDR for an academic meeting, study or conference participation for a day. The majority of Thai, Vietnamese, and Chinese visitors were day visitors to the country.

The results showed that the most common reasons for visiting the Lao PDR were for 'holiday and vacation' (58%) followed by 'business and commercial purposes (13%), 'Conferences and meetings' (8%), 'visiting families and friends' (6%). Table 4.2 showed about three percent of the respondents used the Lao PDR as a 'transit' route.

Visitors from Thailand (29%) had the shortest average stay in the Lao PDR (4.1days/visit) whereas visitors from Vietnam spent 6.2 days per visit. Europeans and Americans stayed longer (9.3 days/visit) than the overall average followed visitors from other SEA, East Asia and the Pacific countries. The results revealed that Thai and Vietnamese visitors (43% of the total arrivals in the country) stayed a shorter duration and spent less than the average

expenditure. About 15 percent of the respondents stayed more than 10 days in the Lao PDR; the longest was 42 days (see Table 4.2). About 64 percent of the respondents spent 3-8 days in Lao PDR in their trip. The results showed that the average length of stay of the respondents was 6.83 days per visit.

Table 4.2 Socio-economic characteristics of the respondents visiting the Lao PDR in 2009.

Profile	Characteristics	Frequency	Percentage (n=417)
Mode of arrival	Air	145	34.8
	Car/van	95	22.8
	Train	31	7.4
	Bus including tour bus	136	32.6
	Boat	10	2.4
Duration of stay	Day visitors	34	8.2
	1-3 days	57	13.6
	4-6 days	140	33.5
	7-9 days	101	24.3
	10 days and more	85	20.4
Purpose of visit	Holiday and vacation	242	58.0
	Business and commercial	55	13.2
	Conference and meeting	33	7.9
	Visit family and friends	25	6.0
	Study/academic	24	5.8
	Sport and recreation	13	3.1
	Transit	14	3.4
	Others	11	2.6
Origin country or region	Thailand	119	28.5
	Vietnam	56	13.4
	China, Cambodia, Myanmar	61	14.6
	East/other SEA and PA	78	18.7
	Europe America	86	20.6
	Rest of the world	17	4.1

Source: Visitors' Expenditure Survey, 2009
Note: Other SEA countries in this study are Indonesia, Malaysia, Singapore and the Philippines. PA, the Pacific countries are Australia and New Zealand.

4.2 Expenditure patterns and origin of international visitors to the Lao PDR

A total of 417 international visitors were surveyed in the Lao PDR in 2009 and the figures were extrapolated based on the expenditure details (see Chapter 3, Table 3.6). The figures obtained from the visitors' expenditure survey were extrapolated based on the national tourism statistics. The results showed the average amount spent by the respondents was US$246/trip with an average daily expenditure of US$36. The average length of the stay was

6.83days/trip. The respondents spent 30 percent of their total expenditure in the accommodation sector, amounting to US$84m, and US$69m for food and beverages, which accounted for 25 percent. The survey results further revealed that a total of US$36m (13% of the total expenditure) was spent in the shopping sector and 16 percent on entertainment and recreation amounting to US$44m. Similarly, US$13m (5%) was spent on local transportation, US$11m (4%) in finance and communication related expenses and US$17m (6%) in visa fees and miscellaneous expenses.

Forty two percent of the combined total arrivals in the Lao PDR were from Thailand (495,000 visitors, 29%) and Vietnam (233,000 visitors, 13%) followed by other SEA, East Asia and the Pacific countries (358,000 visitors, 22%), European and American (325,000 visitors, 19%), China, Cambodia and Myanmar (254,000 visitors, 14%), and the Rest of the World (70,000 visitors (5%). The results indicated that the country received the majority of its visitors from neighbouring countries (Thailand, Vietnam and China), other SEA countries (Indonesia, Malaysia, Singapore and Philippines), North American and European countries, East Asian (Japan and South Korea) and the Pacific member countries (Australia and New Zealand).

Table 4.3 shows the visitors' expenditure patterns based on their country of origin. Thailand, the biggest proportion of the Lao PDR's international visitor arrivals spent less in accommodation (26%) but had relatively higher expenses in food and beverages (27%) of the total expenditure. Other countries' visitors spent more in accommodation: Vietnam (34%); China, Cambodia and Myanmar (31%); Europe and America (28%); other SEA countries, East Asia and the Pacific (28%) and Rest of the World (28%).

Visitors from Thailand spent more on retail trade or shopping (17%) and recreational activities (10%) than other visitors. All respondents paid visa fees on entering the Lao PDR, except the visitors from GMS countries and SEA member countries. The visa fee in Lao PDR costs US$8-42/trip/person (LNTA, 2009). Meanwhile, visitors from Europe and America spent more on miscellaneous expenses (including visa fees) than GMS and other SEA member countries' visitors (see Table 4.3). Visitors from GMS countries spent more on entertainment and recreational activities while visitors from Europe, America and other SEA countries spent more on sightseeing, and transportation and communication expenses.

Table 4.3 Expenditure of the respondents by country of origin in the Lao PDR in 2009.

(N = 417, figures are in percentage)

Sector	Thailand	Vietnam	China ROM	Euro Ame	SEA, EA, PA	Rest of World
Accommodation	26.4	33.7	31.29	28.0	27.8	27.5
Food and beverages	26.6	25.0	22.55	18.4	18.7	17.8
Shopping/retail trade	17.3	9.6	10.81	9.8	10.2	10.5
Local transportation	10.1	11.1	9.76	10.6	11.3	10.1
Sight seeing	4.2	5.8	6.51	6.8	8.8	5.5
Recreational activities	9.8	8.3	8.18	7.3	7.8	6.4
Communications	4.0	4.7	5.65	4.4	5.1	5.9
Visa fee	0.0	0.0	3.44	11.3	6.3	12.5
Miscellaneous	1.6	1.7	1.79	3.5	3.9	3.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Visitors' Expenditure Survey, 2009
Note: Euro Ame = European and American Countries, other SEA = Singapore, Malaysia, Indonesia and Philippines, EA PA = East Asia and the Pacific, ROM = Rest of the Mekong (Cambodia and Myanmar)

Table 4.4 shows the total gross receipts from visitor arrivals in the Lao PDR. The figures obtained from the international visitors' expenditure survey and were extrapolated based on the visitors' expenditure pattern to the national level tourism data. The results show that GMS countries provide more arrivals (56%), but shorter stays, so ultimately a lower percentage contribution in tourism receipts (40%) in the country. Thailand has a 29 percent share of visitor arrivals but the total receipts averaged about 17 percent (US$69m). Vietnam had over 13 percent of total arrivals but contributed only 10 percent of total tourism receipts (US$39million). Similarly, China, Cambodia and Myanmar had 15 percent of total arrivals but the contribution to total tourism receipts was 13 percent (US$52m). This is because visitors from GMS countries stay shorter and spent lower than other visitors.

Table 4.4 Total gross receipts from visitor arrivals to the Lao PDR in 2009.

Country/region of origin	Expenses/ trip /tourist (US$)	Duration of stay per trip (Days)	Expenses per tourist per day (US$)	Total tourists (million)	Estimated income (mil US$)	Total receipts (%)
Thailand	140.4	4.10	34.25	0.4956	69.72	16.78
Vietnam	169.4	6.13	27.64	0.2332	39.59	9.53
China, ROM	205.4	7.16	28.69	0.2540	52.29	12.58
Europe America	337.0	9.33	36.12	0.3249	109.70	26.40
SEA, EA, PA	341.4	8.88	38.44	0.3582	122.50	29.48
Rest of the World	304.6	7.94	38.36	0.0708	21.61	5.20
Average	**245.59**	**6.83**	**35.96**	**1.7367**	**415.50**	**100.0**

Source: Visitors' Expenditure Survey, 2009
Note: Euro Ame = European and American Countries, SEA = Singapore, Malaysia, Indonesia and the Philippines, EA = East Asia, PA= the Pacific, ROM = Rest of the Mekong (Cambodia and Myanmar)

Visitors from Europe, America, other SEA, East Asia and the Pacific showed a higher percentage contribution to tourism receipts because of their longer stays and higher average daily expenditure (see Table 4.4). The results also showed 19 percent of the visitors from Europe and America visited Lao PDR but they contributed 26 percent to the Lao PDR tourism receipts (US$109m). For example, the results showed 21 percent of visitors from other SEA, East Asia and the Pacific visited the Lao PDR and contributed 29 percent (US$122m) to tourism receipts. In terms of expenses per trip, visitors from Thailand spent least on average, about US$140 per visit (US$34/day/tourist), whereas visitors from other SEA countries, East Asia and the Pacific spent about US$341 per visit (US$38/day/tourist). Similarly, visitors from China and Vietnam spent US$205 (US$33/day/tourist) and US$169 (US$28/day/tourist) per visit respectively (see Table 4.4).

4.3 Macroeconomic indicators of the Lao PDR economy

The Lao PDR economic structure in terms of commodities and services flow is based on supply and demand computed by the 2003 and 2008 I-O models (see Table 4.5). The total supply of commodities and services in 2003 (US$3,921m) was supported by 32 percent of domestic inputs; 49 percent of Gross Valued Added (GVA) while imports contributed 19 percent to the economy. On the demand side, the total intermediate demand contributed 32 percent while the total final demand, including exports, had a 68 percent share in 2003. The total gross output of the Lao PDR in 2008 rose to about US$6,355m from US$3,921m in 2003, an average annual growth rate of 12.4 percent.

Table 4.5 Macroeconomic indicators of the Lao PDR economy (2003 and 2008).

Description	2003 (million US$)	Total outputs (%)	2008 (million US$)	Total outputs (%)	Annual growth (%)
Supply side		***100.0***		***100.0***	
Total domestic inputs	1,257.9	32.1	1,874.7	29.5	9.8
Imports	738.4	18.8	1,869.2	29.4	35.2
Import taxes	72.2	1.8	198.8	3.1	30.6
Gross value added	1,924.6	49.1	2,610.9	41.1	7.1
Total inputs	**3,921.1**		**6,354.8**		**12.4**
Demand side		***100.0***		***100.0***	
Total intermediate demand	1,257.9	32.1	1,874.7	29.5	9.8
Total final demand	2306.0	58.8	3436.2	54.1	9.7
Exports	357.1	9.1	1,043.8	16.4	38.4
Total outputs	**3,921.1**		**6,354.8**		**12.4**

Source: Lao PDR I-O Tables 2003 and 2008

During this period, the total domestic demand increased by 9.8 percent while the total final demand rose by 9.7 percent. In 2003, the total domestic input was US$1,258m, which

increased to US$1,875m by 2008, an annual growth rate of 9.8 percent. GVA and total final demand were US$1,925m and US$2,663m, respectively, in 2003. Similarly, in 2008, the GVA and total final demand increased to US$2,611m and US$4,480m with annual growth rates of 7.1 and 9.7 percent, respectively.

Figure 4.1 shows the indicators of the changes in the economic structure of the Lao PDR in 2003 and 2008. During this period, imports increased by 35 percent average per annum contributing 29 percent to the total outputs in 2008. Similarly, Lao PDR exports had also grown rapidly during the same period, an average rate of 38 percent annually, which was a 16 percent share of the total output in the country's economy.

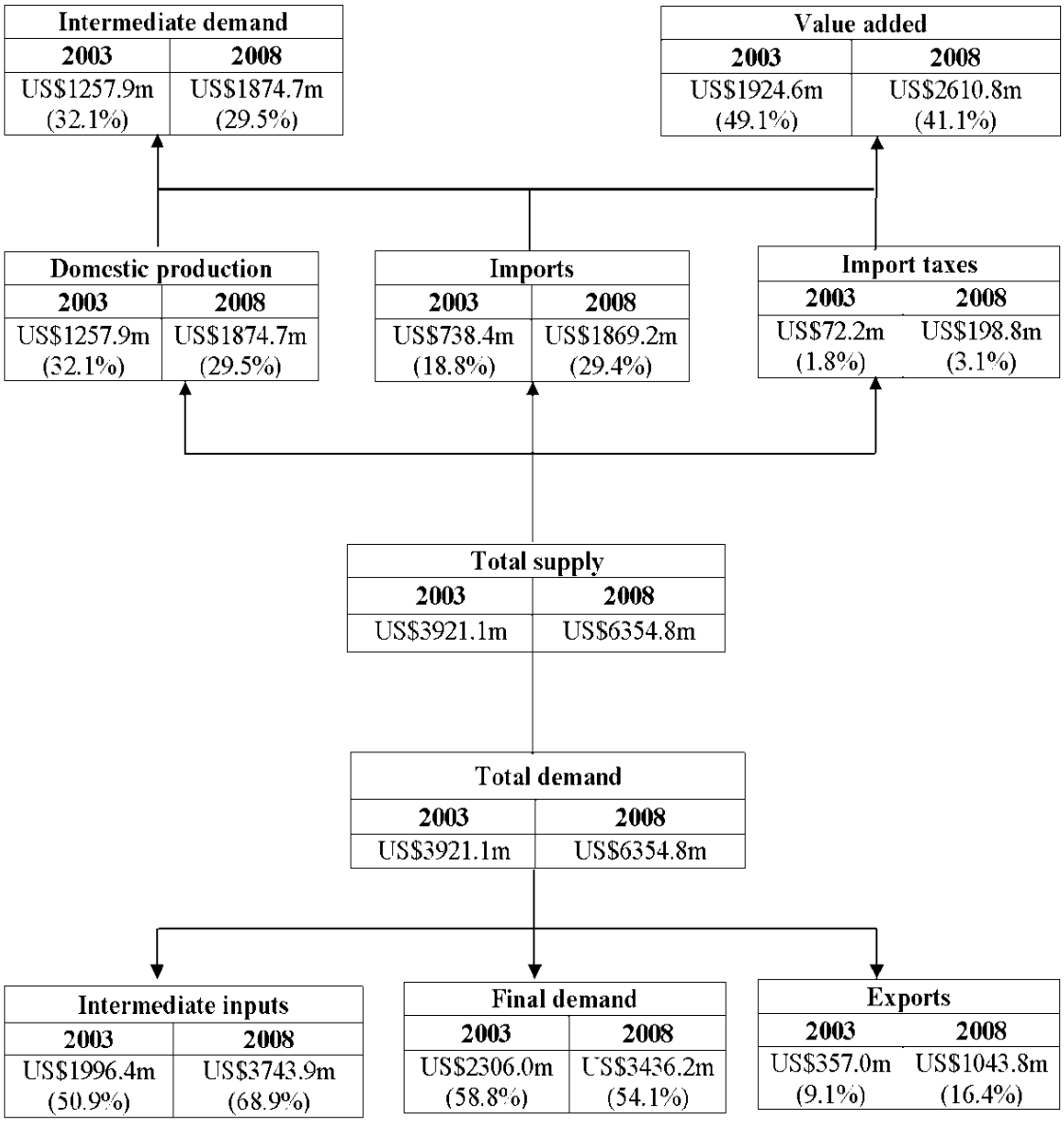


Figure 4.1 Structure of Lao PDR economy, 2003 and 2008 (million US$).

The total final demand was estimated at US$2,306m in 2003; it increased to US$3,436m in 2008. In terms of intermediate inputs, the share of domestic production was US$1,257m (32% of the total inputs) in 2003 and US$1,874m (29% of total inputs) in 2008 (see Figure 4.1). The Lao PDR government received US$72m (2% of total output) as import taxes in 2003 and US$199m in 2008 contributing three percent to the total output of the country's economy.

4.3.1 Gross value added of the Lao PDR economy

Table 4.6 shows the GVA of the economic sectors in the Lao PDR for 2003 and 2008. The total GVA was US$1,924m in 2003 and US$2,611m in 2008 with an average value added growth rate of seven percent a year. The main contributor to the growth of the GVA in 2008 was the service sector. The service sector's contribution to GVA increased from 25 percent to 34 percent in the same period. The total GVA contribution of the industry sector was US$675m (35%) in 2003 and US$772m (30%) in 2008. The GVA of the tourism sector increased from US$30.9m (2003) to US$49.6m (2008); an annual growth rate of 12.1 percent. The overall national GVA annual increment for the same period was just over seven percent. However, tourism sector's share of the GVA to the service sector was 6.4 percent in 2003 but decreased to 5.6 percent in 2008. In 2008, agriculture and livestock (25.5%), wholesale and retail trade (11.6%), and forestry and logging (10.8%) were the three major sectors contributing more GVA to the Lao PDR economy.

Table 4.6 Gross value added by the Lao PDR economic sectors in 2003 and 2008.

Economic sectors	2003			2008		
	Value (mil.US$)	Contribution (%)	Share by sector (%)	Value (mil.US$)	Contribution (%)	Share by sector (%)
Agriculture	**770.0**	**40.0**	**100.0**	**949.2**	**36.4**	**100.0**
Agriculture and livestock	673.4	35.0	87.4	666.5	25.5	70.2
Forestry and logging	96.7	5.0	12.6	282.7	10.8	29.8
Industry	**675.4**	**35.1**	**100.0**	**772.1**	**29.6**	**100.0**
Mining and quarrying	76.5	4.0	11.3	252.2	9.7	32.7
Food and beverages manufacturing	287.6	14.9	42.6	164.0	6.3	21.2
All other manufacturing	76.9	4.0	11.4	164.0	6.3	21.2
Electricity and water supply	25.6	1.3	3.8	92.6	3.5	12.0
Construction	208.6	10.8	30.9	99.3	3.8	12.9
Services	**479.2**	**24.9**	**100.0**	**889.6**	**34.1**	**100.0**
Transport and communication	13.5	0.7	2.8	65.2	2.5	7.3
Wholesale and retail trade	182.8	9.5	38.1	303.0	11.6	34.1
Banking and Finance	35.6	1.9	7.4	111.0	4.3	12.5
Real estate and business services	53.2	2.8	11.1	109.2	4.2	12.3
Public administration	58.4	3.0	12.2	166.3	6.4	18.7
Personal, social and community services	104.8	5.4	21.9	85.3	3.3	9.6
Tourism	**30.9**	**1.6**	**6.4**	**49.6**	**1.9**	**5.6**
Total	**1,924.6**	**100.0**		**2,610.9**	**100.0**	

Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

4.3.2 Exports and imports of Lao PDR

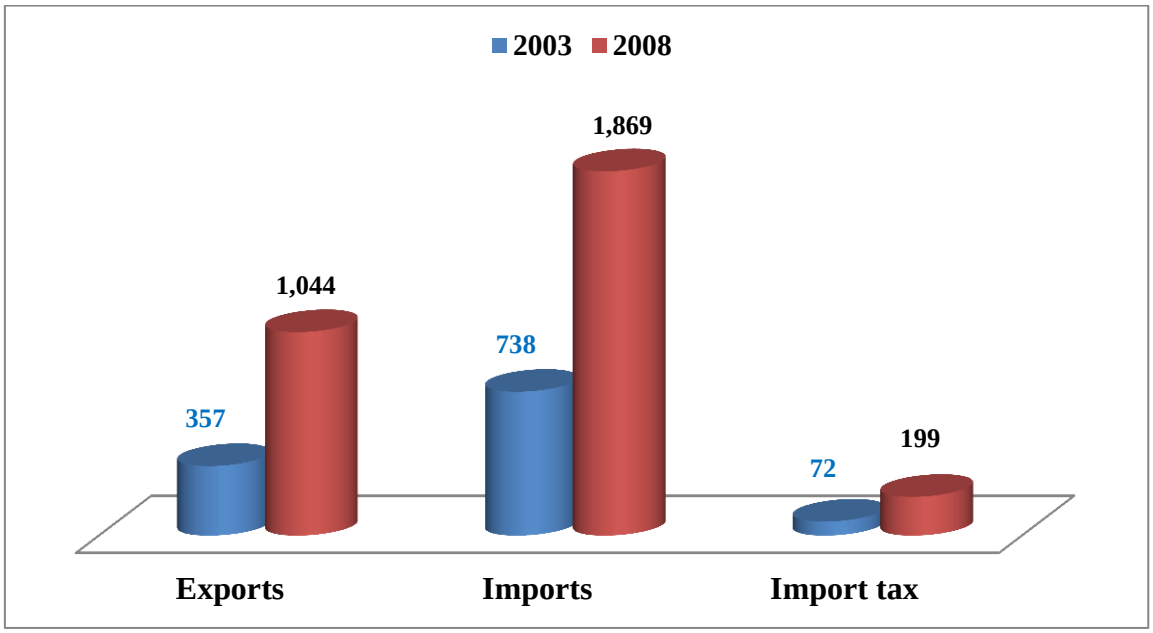
Table 4.7 shows exports and imports of the Lao PDR economy during 2003-2008. The total exports of all economic sectors were US$357m in 2003, which increased to US$1,044m in 2008; an average annual growth rate of over 38 percent. Meanwhile, imports also increased, from US$738m in 2003 to US$1,869m in 2008; an average annual growth rate of 30 percent. The balance of payments of the Lao PDR for 2008 was -US$829m.

Table 4.7 Exports and imports of the Lao PDR, 2003-2008 (million US$).

Description	2003	2004	2005	2006	2007	2008
Export	357	506	648	996	1,025	1,044
Import	738	958	1,081	1,397	1,794	1,869

Sources: 2003 and 2008 Lao PDR I-O tables and 2004, 2005, 2006, 2007: World Bank Report 2008

Figure 4.2 shows the total exports, imports and import taxes in 2003 and 2008 of the Lao PDR economy. The volume of import taxes increased from US$72m in 2003 to US$199m in 2008, generating a significant contribution to the government revenue with an average annual growth rate of 35 percent. The results show that every US$1m of visitors' expenditure increases tourism business taxes by US$139,600 in the country's total tax revenue.



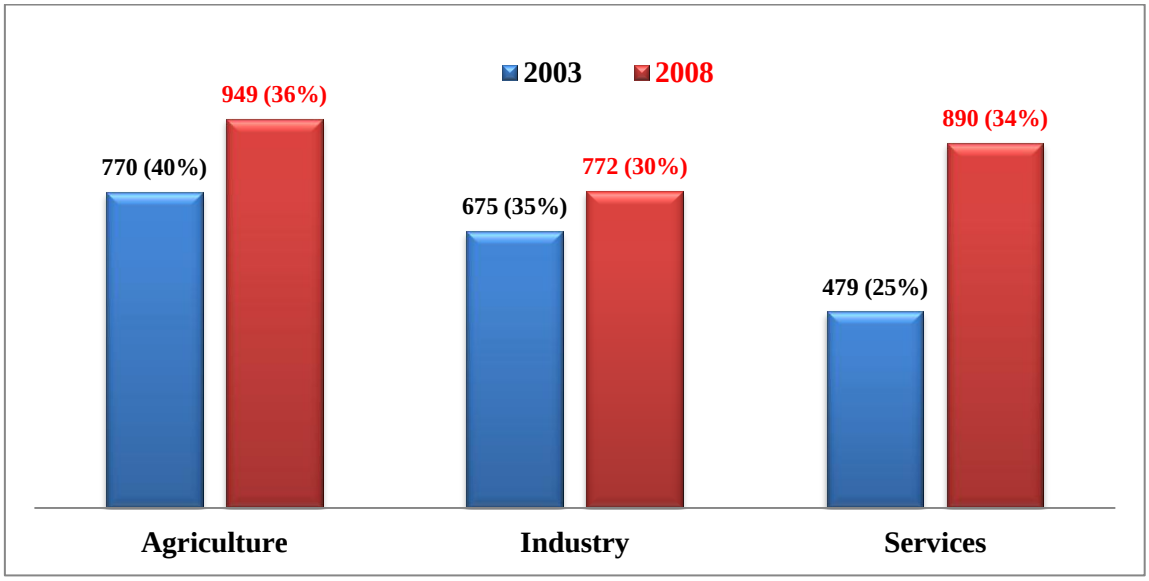
Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

Figure 4.2 Exports, imports and import taxes, Lao PDR, 2003 and 2008.

4.3.3 Sector Gross Domestic Products (GDP) of the Lao PDR

The study computed the sector GDPs of the Lao PDR (including the tourism sector) to compare tourism's share of the national GDP. Figure 4.3 shows the three major sectors' contributions to the country's economy for 2003 and 2008. The agriculture sector's

contributions fell from 40 to 36 percent between 2003 and 2008. The contribution of the industry sector decreased to 30 percent from 35 percent during the same period. The GDP contribution of the industry sector was valued at US$772m, with agriculture contributing US$949m in 2008 but, in 2003, these were US$770m and US$675m, respectively. Meanwhile, the service sector contributed substantially to the GDP in 2008 (34%) with the total value of US$890m from US$479m (25%) in 2003. The results showed that the service sector was growing fast compared with the agriculture and industry sectors during this period.



Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

Figure 4.3 Sector shares of GDP of the Lao PDR in 2003 and 2008.

Table 4.8 shows the GDP contribution of the economic sectors of the Lao PDR. The tourism sector's contribution to national GDP was only 3.7 percent in 2003 but it reached 7.5 percent in 2008. The sector was ranked the fourth largest among the 14 economic sectors of the country in GDP contribution. In 2008, the three sectors that contributed more extensively to the GDP than the tourism sector were agriculture and livestock (17%); food and beverages manufacturing (16%); and the wholesale and retail trade (13%). Mining and quarrying and forestry and logging were the fastest growing economic sectors; they contributed 6.4 (1.3%: 2003) and 6.2 (1.6%: 2003) percent and ranked fifth and sixth to the GDP growth in 2008. The banking and finance and personal, social and community services sectors were the lowest contributing sectors to the GDP with the values of 2.9 and 3.4 percent in 2008, respectively.

Table 4.8 Gross domestic product of the Lao PDR (million US$).

Sectors	2003		2008	
	GDP	Share (%)	GDP	Share (%)
Agriculture and livestock	286.07	22.7	322.5	17.2
Forestry and logging	16.97	1.3	114.6	6.2
Mining and quarrying	21.97	1.7	120.9	6.4
Food and beverages manufacturing	578.38	46.0	298.4	15.9
Other manufacturing	34.54	2.7	115.6	6.1
Electricity and water supply	15.05	1.2	81.3	4.3
Construction	53.74	4.3	84.8	4.5
Transport and communication	13.04	1.0	78.6	4.2
Wholesale and retail trade	126.59	10.1	238.3	12.7
Banking and finance	10.56	0.8	64.5	3.4
Real estate and business services	10.4	0.8	66.2	3.5
Public administration	20.22	1.6	95.6	5.1
Personal, social and community services	24.07	1.9	55.1	2.9
Tourism	**46.39**	**3.7**	**138.5**	**7.5**
Total	**1,258.0**			**1,874.9**

Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

Table 4.9 shows the tourism macroeconomic indicators from the Lao PDR I-O models for 2003 and 2008. The tourism macroeconomic indicators derived from the I-O models revealed its position and economic impact in the economy. Comparing the figures, the results show that significant increments were observed in tourism exports, domestic inputs, GVA, imports and output. Lao PDR's tourism GVA increased 12 percent on average per annum while the national GVA increased just above nine percent on average per annum between 2003 and 2008.

Table 4.9 Tourism macroeconomic indicators of the Lao PDR.

Description	2003 (m US$)	2008 (m US$)	Annual increment (%)
Imports	30.69	119.76	58.1
Import tax	3.27	16.72	82.3
Exports	14.58	29.92	21.1
Total domestic inputs (TDI)	26.39	106.50	60.7
Gross value added (GVA)	30.87	49.64	12.2
Total final demand (TFD)	57.85	176.74	41.1
Total gross output (TGO)	87.96	275.90	42.7

Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

The country's tourism exports increased from US$15m in 2003 to US$30m in 2008, an average annual growth rate of 21 percent (see Table 4.9). However, tourism imports have also increased significantly from US$30m in 2003 to US$119m in 2008 at an average annual growth rate of 58 percent. Import taxes as government revenue from the tourism sector increased from US$3m in 2003 to US$17m in 2008 with a significant average annual

increment of over 82 percent. The total final demand of the tourism sector was US$58m in 2003 but it grew significantly to US$177m in 2008 at an average annual growth rate of 41 percent. The total gross outputs of the tourism sector have also increased annually by 43 percent (US$87m in 2003 & US$275m in 2008) during the same period.

4.3.4 Input-output coefficients of the Lao PDR economy

Miller and Blair (2009) reported that the I-O coefficients reveal the amount of inputs required directly from each sector to produce a dollar's worth of output of a given sector. For example, the tourism sector column of the I-O table shows the inputs purchased from various production sectors necessary to produce one dollar of tourism output. Based on the 2008 Lao PDR I-O table, in order to produce a dollar output in the tourism sector, the sector must purchase $0.034 from the agriculture and livestock sector, $0.015 from forestry and logging, $0.059 from food and beverages manufacturing sector, $0.039 from other manufacturing, etc. (see Appendices 6 and 7 for 2003 and 2008 I-O coefficients, respectively). These coefficients give the direct effects or first round effects in all sectors due to a dollar change in output in a particular sector. The coefficient value represents the amount of raw materials or services to be purchased in order to make one unit of output (Sharma, 2002).

The results show that every dollar's worth of output in the tourism sector required direct purchases of 28 cents (21 cents: 2003) from the agriculture sector, 30 cents (29 cents: 2003) from the industry sector, and 42 cents (51 cents: 2003) from the services sector of the total intermediate inputs in 2008. The tourism sector purchased inputs from different economic sectors that ultimately increased those sectors' outputs in the country. The I-O coefficients showed that, the tourism sector is consuming more inputs by seven cents of a dollar expenditure as intermediate products in 2008 than in 2003. The results showed that the tourism sector is labour intensive, whereby a high percentage of sales goes into wages and salaries that make the indirect and induced effects important in the country's economy.

4.4 Estimation of the multipliers of economic sectors in the Lao PDR

The economic multipliers in this study are used to estimate output, income, value added, employment and imports for both normal and ratio multipliers attributable to the visitors' expenditure in the Lao PDR economy.

4.4.1 Normal and ratio multipliers

Using the I-O model, normal multipliers are measured in three stages (direct, indirect and induced) while ratio multipliers are in two stages (Type I and Type II) for the 2003 and 2008

Lao PDR I-O models and the results were compared. Table 4.10 shows the normal and ratio multipliers of the Lao PDR economic sectors in 2003. The results reveal that the food and beverages manufacturing sector ranked first in terms of normal multipliers (direct: 1.67; indirect: 1.91; and induced: 2.75) followed by agriculture and livestock sector (direct: 1.26; indirect: 2.03; and induced: 2.49).

The tourism sector ranked third in normal multipliers with direct impacts of 1.29, indirect impacts of 1.53 and induced impacts of 1.89 in 2003. Normal multipliers indicate the amount of income that is generated per dollar of visitors' expenditure. In terms of ratio multipliers, the agriculture and livestock sector ranked first followed by the food and beverages manufacturing sector (Type I: 2.87 and Type II: 5.27) and the tourism sector (Type I: 2.47 and Type II: 4.29) (see Table 4.10). Ratio multipliers give an overview of the degree of interdependence in the economy and the relative importance of the secondary effects (indirect and induced impacts). The higher the Type I multiplier value, the higher the indirect impacts and the higher the Type II multiplier value the higher the cumulative indirect and induced impacts (Tantirigama & Taniguchi-Singh, 2009). Among the low yielding multipliers, real-estate and business services, and the construction, and mining and quarrying sectors featured in 2003 in the Lao PDR economy.

Table 4.10 Normal and ratio multipliers of the Lao PDR economic sectors in 2003.

Sectors	Direct impacts	Rank	Indirect impacts	Rank	Induced impacts	Rank	Type I	Rank	Type II	Rank
Agriculture and livestock	1.265	4	2.030	1	2.498	2	2.870	1	5.270	1
Forestry and logging	1.116	13	1.291	11	1.428	11	2.273	11	3.687	11
Mining and quarrying	1.121	12	1.125	14	1.246	14	2.125	14	3.358	14
Food and beverages manufacturing	1.673	1	1.915	2	2.751	1	2.818	2	5.232	2
All other manufacturing	1.200	7	1.448	6	1.698	5	2.407	6	4.063	6
Electricity and water supply	1.239	5	1.329	9	1.589	8	2.311	9	3.850	9
Construction	1.134	10	1.202	13	1.345	13	2.194	13	3.522	13
Transport and communication	1.296	2	1.449	5	1.791	4	2.414	5	4.127	5
Wholesale and retail trade	1.099	14	1.552	3	1.696	6	2.511	3	4.194	4
Banking and finance	1.159	8	1.302	10	1.484	10	2.282	10	3.741	10
Real estate and business services	1.134	11	1.227	12	1.373	12	2.216	12	3.571	12
Public administration	1.205	6	1.367	8	1.605	7	2.339	8	3.904	7
Personal, community and social services	1.142	9	1.388	7	1.565	9	2.358	7	3.900	8
Tourism	**1.296**	**3**	**1.531**	**4**	**1.897**	**3**	**2.477**	**4**	**4.291**	**3**

Source: Lao PDR I-O Table 2003 by SimSIP SAM Software

Table 4.11 shows the normal and ratio multipliers of the Lao PDR economic sectors in 2008. Agriculture and livestock, and the wholesale and retail trade were the highest normal and ratio multiplier generating sectors followed by the tourism sector. In 2008, of the total multipliers generated by the tourism sector, the corresponding shares of direct, indirect and induced impacts were 1.386, 1.772 and 2.264, respectively.

The large values for the indirect and induced effects of the tourism sector indicate the importance of tourism's secondary impacts in the economy. In 2008, the Type I and Type II multipliers of the tourism sector were 2.772 and 4.791, respectively (see Table 4.11). In 2008, the low yielding multipliers featured real-estate and business services, public administration and personal, social and community service sectors. Miller and Blair (2009) showed that the multiplier may change over time because of price changes or structural changes of an economy. Similarly, Chhabra, Sills and Cubbage (2003) described the total impact of a tourism multiplier in a region or a country is attributable to a dollar of expenditure that adds up all the transactions initiated by the visitors' expenditure. Different sectors have varying multiplier coefficients, which means their ability to generate economic activity is different (Tantirigama & Taniguchi-Singh, 2009).

In general, the results showed that the service sectors generally had higher economic multipliers than the manufacturing sectors in the Lao PDR. This shows that the service sectors are more labour intensive than the manufacturing sectors. Manufacturing sectors exhibit imports and high level of foreign employees which ultimately creates income leakages and less multiplier effects in the domestic economy in the country. The higher incomes of the employees in the tourism sector resulted in more purchases of goods and services for personal consumption in the economy from the increased tourism income. This resulted in money being re-circulated in the local economy, which created higher indirect and induced impacts with higher multipliers.

Table 4.11 Normal and ratio multipliers of the Lao PDR economic sectors in 2008.

Sectors	Direct impacts	Rank	Indirect impacts	Rank	Induced impacts	Rank	Type I	Rank	Type II	Rank
Agriculture and livestock	1.265	10	2.207	2	3.849	1	3.207	2	6.514	1
Forestry and logging	1.235	11	1.653	5	2.212	4	2.653	5	4.679	4
Mining and quarrying	1.284	6	1.637	7	2.087	5	2.637	7	4.547	6
Food and beverages manufacturing	1.446	1	1.724	4	2.055	6	2.724	4	4.591	5
All other manufacturing	1.289	5	1.531	11	1.819	11	2.531	11	4.231	11
Electricity and water supply	1.422	2	1.646	6	1.905	10	2.646	6	4.408	9
Construction	1.230	13	1.579	8	2.027	7	2.579	8	4.457	7
Transport and communication	1.279	7	1.569	9	1.924	9	2.569	9	4.352	10
Wholesale and retail trade	1.303	4	2.231	1	3.821	2	3.231	1	6.467	2
Banking and finance	1.211	14	1.562	10	2.015	8	2.562	10	4.436	8
Real estate and business services	1.266	9	1.492	12	1.759	12	2.492	12	4.148	12
Public administration	1.271	8	1.438	13	1.625	13	2.438	13	3.987	13
Personal, community and social services	1.235	12	1.394	14	1.572	14	2.394	14	3.902	14
Tourism	**1.386**	**3**	**1.772**	**3**	**2.264**	**3**	**2.772**	**3**	**4.791**	**3**

Source: Lao PDR I-O Table 2008 by SimSIP SAM Software

4.4.2 Average tourism economic multipliers in Lao PDR

Table 4.12 shows the average tourism economic multipliers for 2008 in the Lao PDR economy. The tourism output multiplier revealed that every dollar in visitors' expenditure would generate 1.54 dollars of total output in the economy. Similarly, every US$1m of the tourism receipts increased the total output of the economy directly by US$544,260. The estimation reveals that a total of US$275m tourism receipts in 2008 generated US$424m of tourism related total output in the economy (average tourism output multiplier of 1.54).

In terms of normal multipliers, the direct, indirect and induced impacts that can be attributed to the total impacts on the average impacts are 0.386, 0.379 and 0.778, respectively (see Table 4.12). The relatively larger value of indirect impacts (0.682) indicates that the tourism sector creates high secondary effects in output generation. The relatively high Type I (1.98) and Type II (3.99) multipliers show tourism's strong linkages with other economic sectors, reflecting the significance of the tourism sector's secondary impacts on the economy. In terms of income multiplier, every dollar spent by visitors generated 0.34 dollars of household income in the economy. Of this, 0.21 was direct income, 0.09 was indirect income and 0.04 was induced income impact in the economy.

Table 4.12 Average tourism economic multipliers in the Lao PDR economy in 2008.

Tourism sector's indicators	Normal multipliers					Ratio multipliers		
	Direct	Indirect	Induced	Total	Rank	Type I	Type II	Rank
	a	b	c	(a+b+c)		(a+b)/a	(a+b+c)/a	
Output	0.38621	0.37970	0.77835	1.54426	1	1.98314	3.99849	1
Income	0.21693	0.09043	0.03742	0.34478	4	1.41685	1.58937	4
Employment	0.06818	0.02224	0.01914	0.10956	5	1.32619	1.60692	3
Value added	0.22687	0.14495	0.04025	0.41206	3	1.63891	1.81632	2
Imports	0.35201	0.04356	0.03855	0.43412	2	1.12375	1.23326	5

Source: Lao PDR I-O Table 2008 using SimSIP SAM Software

The average total income impacts resulting from tourism amounted to US$94m in 2008 (income multiplier of 0.34, see Table 4.12). The income multiplier measures the total change in income throughout the economy from every dollar increase in final demand of any given sector. Overall, the income multiplier of the tourism sector shows that for every US$1m of the visitors' expenditure the total household income increases directly by US$344,780 in the country. For example, households purchase goods and services for personal consumption using the income from tourism. The income ratio multipliers are relatively low (Type I: 1.41 and Type II: 1.58) compared with the output ratio multipliers, which indicates that the

primary impacts created larger income effects than the secondary impacts in terms of income generation. This is because the tourism sector direct payment has a relatively high, wage-intensive structure. The tourism sector is labour intensive. Majority of the tourism income in the country goes to wages and salaries of the employees. This is also evidenced by a large number of foreigners working in the country's tourism sector resulting in high level of income leakage.

In terms of employment, every US$1m of annual tourism receipts increased employment directly by 68 people and indirectly by 41 people (22 indirect and 19 induced jobs) generating a total employment of 109 in the country's economy in 2008 (see Table 4.12). This multiplier measures the average number of additional employment positions generated for an million dollars of visitors' expenditure. The findings reveal that one out of seven people depends on tourism sector for their employment in the country. The relatively smaller number of indirect and induced employment impacts indicate the lesser importance of the secondary impacts in generating indirect employment compared with the direct impacts. The average employment ratio multipliers of the tourism sector yielded Type I (1.326) and Type II (1.606) multipliers and ranked third overall.

Overall, every US$1m of the tourism receipts increased the value added directly by US$412,060 to the country's economy. The value added multiplier measures the change in total value added for a dollar change in final demand for a given sector. In 2008, the tourism sector generated about US$113m in the form of value added by tourism businesses (value added multiplier of 0.41, see Table 4.12). However, Type I (1.638) and Type II (1.816) multipliers showed relatively higher significance of the secondary impacts of value added multipliers on local household income by tourism activities. The higher value of indirect effects showed that the visitors' expenditure was higher in value added than the income from the tourism sector.

In terms of imports, there were relatively high normal multiplier estimates of 0.434, out of which 0.352 was direct, 0.043 was indirect and 0.038 was induced effect in 2008. Overall, every US$1m of tourism receipts increased imports of the tourism sector directly by US$434,120. This shows that direct imports make a significant contribution to the Lao PDR tourism sector; out of a dollar of visitors' expenditure, 43 cents leaked out of the economy in 2008. However, the multiplier leakage ratios of the tourism sector were estimated as 28 percent in 2008 and 24 percent in 2003. The high import multiplier indicates that a substantial

amount of the visitors' expenditure was leaking out of the economy to purchase tourism goods and services required to satisfy international visitors' demands in the country.

4.4.3 Total economic impact of the tourism sector

Table 4.13 shows the total economic impacts of tourism based on the economic multipliers derived from the 2003 and 2008 Lao PDR I-O models. In 2003, the tourism sector generated 1.29, 1.53 and 1.89 multipliers as direct, indirect and induced impacts, respectively. The results showed that the initial visitors' expenditure was US$87m in 2003, which created a direct impact of US$112m in country's economy. Meanwhile, the indirect and induced impacts were generated as US$133m and US$165m, respectively, for the same year. The tourism sector brought higher multipliers of 1.38, 1.77 and 2.26 as direct, indirect and induced effects, respectively, in 2008. Visitors' expenditure of US$275m in 2008 generated US$382m direct, US$489m indirect and US$624m induced impacts, respectively (see Table 4.13). In general, the direct impacts are the impacts of the visitors' payments to the hotel and restaurant sector. Indirect impacts are the impacts of the hotels and restaurants paying to the backward linked industries such as electricity and food manufacturing sectors. Similarly, induced impacts are household income earned by employees from the tourism sector as a result of both direct and indirect impacts, spent for personal/household consumption in the general economy. In this study, the total economic impacts of the tourism sector for 2011, 2013 and 2015 were projected (*) using the 2008 tourism multipliers.

Table 4.13 Total economic impact of tourism on the Lao PDR economy (million US$).

Impacts	Multipliers (2003)	Receipts 2003	Multipliers (2008)	Receipts 2008	Receipts 2011*	Receipts 2013*	Receipts 2015*
Expenditure	-	87.0	-	275.0	289.0	326.0	364.0
Direct	1.295	112.7	1.386	382.5	400.6	451.8	504.5
Indirect	1.531	133.2	1.772	489.1	512.1	577.7	645.0
Induced	1.897	165.0	2.264	624.9	654.3	738.1	824.1

Sources: LNTA (2003, 2008, 2009) and 2003 and 2008 Lao PDR I-O Tables analysis

Based on the 2008 tourism multipliers, the results revealed that, by 2011, a total of US$289m of estimated visitors' expenditure will create US$400m, US$512m and US$654m in direct, indirect and induced impacts, respectively, in the economy (see Table 4.13). Because of output increase in the first round, each of these sectors will experience a need to increase output in the second round followed by the third round and so forth. Similarly, the projected visitors' expenditure of US$364m in 2015 will generate US$504m, US$645m and US$824m as direct, indirect and induced impacts, respectively, in the economy, based on the 2008 tourism multipliers.

4.4.4 Output multipliers of the economic sectors of the Lao PDR

Table 4.14 shows the output multipliers of the 14 economic sectors of the Lao PDR in 2003 and 2008 with their rankings. In 2003, the food and beverages manufacturing; transportation and communication, tourism and agriculture and livestock sectors showed strong output multipliers in the economy. Tourism sector was ranked third in 2008 and attained a higher output multiplier of 1.54 than the 1.41 in 2003. The tourism output multiplier of 1.54 in 2008 implies that for every dollar of output produced by the tourism sector, 54 cents worth of indirect output is generated in the economy. The food and beverages manufacturing sector yielded the highest output multipliers with values of 1.92 and 1.61 for 2003 and 2008, respectively, followed by transportation and communication sector (1.44) in 2003, and electricity and water supply sector (1.57) in 2008 (see Table 4.14). Therefore, these four sectors are considered the most important economic sectors in the Lao PDR economy in their ability to generate output significantly higher than the average output multiplier of all sectors (2008:1.41) within the economy. Larger values of the output multiplier indicate the greater the interdependency of the sector on the rest of the economy (Mazumder et al., 2009). The output multiplier measures how much increased economic activity in other economic sectors is caused by every additional dollar increase in an economic sector (White, 2002). The Lao PDR tourism sector's output multipliers of 1.41 (2003) and 1.54 (2008) are higher than the average of all sector output multipliers in 2003 (1.30) and 2008 (1.41) (see Table 4.14).

Table 4.14 Output multipliers of the Lao PDR economic sectors in 2003 and 2008.

Economic sectors	2003	Rank	2008	Rank
Agriculture and livestock	1.3942	4	1.3828	8
Forestry and logging	1.1610	12	1.3326	11
Mining and quarrying	1.1562	13	1.4125	5
Food and beverages manufacturing	1.9296	1	1.6182	1
Other manufacturing	1.2548	7	1.4005	7
Electricity and water supply	1.3415	5	1.5766	2
Construction	1.1641	11	1.3245	13
Transport and communication	1.4477	2	1.4027	6
Wholesale and retail trade	1.1380	14	1.4328	4
Banking and finance	1.2238	8	1.2912	14
Real estate and business services	1.1653	10	1.3796	9
Public administration	1.2592	6	1.3756	10
Personal, social and community services	1.1850	9	1.3298	12
Tourism	**1.4144**	**3**	**1.5464**	**3**
Average output multiplier (all sectors)	**1.3025**		**1.4147**	

Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

4.4.5 Multipliers of the seven primary tourism activities of the Lao PDR in 2008

Chang (2001) documented that the primary tourism sectors' multipliers reduce aggregation errors and increase flexibility in terms of applying multipliers to spending in different categories. Our study computed the tourism primary sectors' multipliers to assess the important activities of tourism. The aggregated seven primary tourism sectors identified in Table 3.6 (see Chapter 3) were used to estimate the output, income, value added, employment and import multipliers in 2008 in the Lao PDR (see Table 4.15).

4.4.5.1 Output multiplier

Among the tourism related sectors, retail trade/shopping activity yielded the highest output multiplier of normal multipliers (2.20). However, the recreation sector produced the highest ratio multiplier (9.57). The miscellaneous and food and beverages sectors yielded significant normal multipliers of 2.05 and 1.77, respectively. The transportation and communication sector produced significantly lower output multipliers of 1.10 and 1.18, respectively (see Table 4.15). The recreation and entertainment (7.96 and 9.57) and the accommodation (4.30 and 5.06) sectors ranked first and second for the Type I and Type II multipliers, which were well above the average Type I of 3.81 and Type II of 4.38.

4.4.5.2 Income multiplier

The recreation and entertainment and shopping sectors were the two most significant income generating activities based on the normal multipliers because their total multipliers of 1.61 and 1.34, respectively, were significantly higher than the average income multiplier of 0.90. However, in terms of the ratio multipliers, shopping (2.82 and 4.15) and food and beverages activities (2.49 and 4.09) were the two most important activities based on Type I and Type II multipliers (ratio multipliers) (see Table 4.15). For income multipliers, based on normal multipliers, communication and transportation activities were least important but, based on ratio multipliers, the communications and miscellaneous sectors were the least important primary tourism activities in the country. These activities' income multipliers are lower than the average income multiplier of all activities. The results showed that normal and ratio multipliers generate opposite directions of patterns for income multipliers' impacts, for example, food and beverages activity was the fourth most important activity based on the normal multiplier but second most important by the ratio multiplier measure. Similar results were reported by Liu et al. (1984) in Turkey and Mazumder et al. (2009) in Malaysia.

Table 4.15 Output, income, employment value added, and import multipliers of the Lao PDR tourism primary sector activities (2008).

Output	Normal multipliers					Ratio multipliers		
	Direct	Indirect	Induced	Total	Rank	Type I	Type II	Rank
	a	b	c	(a+b+c)		(a+b)/a	(a+b+c)/a	
ACCOMMOD	0.32637	1.07808	0.24948	1.65392	4	4.30324	5.06763	2
FOOD&BEV	0.50437	1.13233	0.14302	1.77972	3	3.24506	3.52862	5
SHOPPING	0.60421	1.24169	0.35466	2.20056	1	3.05508	3.64206	4
TRANSPOR	0.44270	0.50641	0.15939	1.10851	7	2.14392	2.50397	7
REC&ENTE	0.15486	1.07808	0.24948	1.48242	5	7.96146	9.57239	1
COMMUNIC	0.45486	0.67808	0.04948	1.18242	6	2.49073	2.59950	6
MISCELLA	0.54662	1.36912	0.14136	2.05710	2	3.50469	3.76330	3
Average	***0.43343***	***1.01197***	***0.19241***	***1.63781***		***3.81488***	***4.38249***	
Income								
ACCOMMOD	0.36760	0.29912	0.27102	0.93774	3	1.81370	2.55097	5
FOOD&BEV	0.22301	0.33243	0.35845	0.91389	4	2.49061	4.09792	2
SHOPPING	0.32412	0.59166	0.43142	1.34720	2	2.82542	4.15646	1
TRANSPOR	0.15952	0.17552	0.10241	0.43745	7	2.10027	2.74226	4
REC&ENTE	0.44523	0.76144	0.41034	1.61701	1	2.71021	3.63184	3
COMMUNIC	0.22700	0.11253	0.11034	0.44987	6	1.49575	1.98183	7
MISCELLA	0.25652	0.13922	0.22954	0.62528	5	1.54271	2.43753	6
Average	***0.28614***	***0.34456***	***0.27336***	***0.90406***		***2.13981***	***3.08554***	
Value Added								
ACCOMMOD	0.25496	0.21872	0.22626	0.69994	4	1.85787	2.74529	4
FOOD&BEV	0.24206	0.21153	0.32025	0.77384	3	1.87387	3.19692	2
SHOPPING	0.16851	0.28122	0.32789	0.77761	2	2.66890	4.61472	1
TRANSPOR	0.25791	0.25744	0.13024	0.64558	5	1.99819	2.50316	5
REC&ENTE	0.28175	0.25447	0.32231	0.85854	1	1.90318	3.04713	3
COMMUNIC	0.29850	0.21123	0.12704	0.63677	6	1.70761	2.13319	7
MISCELLA	0.22924	0.15445	0.17165	0.55534	7	1.67375	2.42256	6
Average	***0.24756***	***0.22701***	***0.23223***	***0.70680***		***1.95477***	***2.95185***	
Employment								
ACCOMMOD	0.35765	0.19496	0.04436	0.59697	3	1.54513	1.66916	2
FOOD&BEV	0.36331	0.28992	0.02564	0.67886	2	1.79798	1.86854	1
SHOPPING	0.27126	0.06641	0.05464	0.39230	5	1.24482	1.44624	5
TRANSPOR	0.25043	0.02542	0.07529	0.35113	6	1.10152	1.40214	6
REC&ENTE	0.62913	0.19553	0.08623	0.91088	1	1.31079	1.44785	4
COMMUNIC	0.12128	0.01121	0.02564	0.15812	7	1.09242	1.30379	7
MISCELLA	0.32839	0.12560	0.04973	0.50371	4	1.38247	1.53389	3
Average	***0.33163***	***0.12986***	***0.05164***	***0.51314***		***1.35359***	***1.52452***	
Import								
ACCOMMOD	0.48992	0.25225	0.22778	0.96996	1	1.51488	1.97982	4
FOOD&BEV	0.42525	0.35355	0.05597	0.83477	6	1.83141	1.96302	5
SHOPPING	0.46178	0.32145	0.16807	0.95130	2	1.69610	2.06005	3
TRANSPOR	0.37209	0.26458	0.28977	0.92643	3	1.71105	2.48981	1
REC&ENTE	0.45562	0.33255	0.05631	0.84448	5	1.72988	1.85346	6
COMMUNIC	0.39992	0.23851	0.26930	0.90774	4	1.59639	2.26978	2
MISCELLA	0.41227	0.23422	0.08586	0.73235	7	1.56813	1.77640	7
Average	***0.43098***	***0.28530***	***0.16472***	***0.88100***		***1.66398***	***2.05605***	

Source: Lao PDR I-O Tables 2003 and 2008 using SimSIP SAM Software

Note: In terms of normal and ratio multipliers, Rank 1 to 7 indicates the relative significance and importance of each of the seven tourism primary activities where 1 is the most important and the 7 is the least important.

ACCOMMOD = Accommodations, FOOD&BEV = Food and beverages, SHOPPING = Retail trade, TRANSPOR = Transportation, REC&ENTE = Recreation and entertainment, COMMUNIC = Communication, MISCELLA = Miscellaneous

4.4.5.3 Value added multiplier

The largest value added multiplier of 0.85 was generated by the recreation and entertainment sector followed by the shopping sector with a value added multiplier of 0.77 (see Table 4.15). A value added multiplier estimates the effect on the value added generated from the production of a dollar of output for final demand, which is the income of the GDP account of an economy. The food and beverages and accommodation sectors were the third and fourth most important sectors based on the normal multipliers of value added. The miscellaneous and communication sectors appeared to be the least important activities with the lowest ratio multipliers of 2.42 and 2.13 as Type II multipliers, respectively, which are lower than the average Type II multiplier of 2.95. These sectors are considered to have weak linkages with other economic activities in the economy in generating the households' income in the country. The shopping (Type I: 2.66 and Type II: 4.61) and food and beverages (Type I: 1.87 and Type II: 3.19) activities were the two most important sectors, generating the highest ratio value added multipliers in the tourism sector.

4.4.5.4 Employment multiplier

In terms of the employment multiplier, the recreation and entertainment sector again had the highest normal multiplier of 0.91, followed by the food and beverages sector with 0.67 (see Table 4.15). The third most important sector was the accommodation activity with a 0.59 normal multiplier, which was above the estimated average multiplier of all sectors of 0.51. When the ratio multipliers are considered, the results showed that the food and beverages (Type I: 1.79 and Type II: 1.86) and the accommodation (Type I: 1.54 and Type II: 1.66) activities yield higher multipliers than the average multipliers (Type I: 1.35 and Type II: 1.52) of all activities. The transportation and communication sectors have relatively lower ratio multipliers and ranked sixth and seventh, which was well below the average of all primary tourism sectors' multipliers.

4.4.5.5 Import multiplier

In terms of the direct import multiplier, the accommodation sector was the highest import multiplier generator with a value of 0.48 followed by the shopping sector (0.46). The higher the import multiplier, the greater the value of tourism receipts leaking out of the economy. The miscellaneous and food and beverage sectors generated the lowest import direct multipliers of 0.41 and 0.42, respectively (see Table 4.15). These sectors are relatively more dependent on local products for the tourism sector in Lao PDR. Similarly, the transportation (1.71 and 2.48) and communication (1.59 and 2.26) sectors have the two highest Type I and Type II multipliers (ratio multipliers), well above the average multipliers of 1.66 for Type I

and 2.05 for Type II. The higher the propensity to import, the lower the resultant value of the multipliers and the lower the benefits to the economy (WTO, 1981).

Table 4.16 shows the tourism output and income multipliers for different economies around the world. Our study results generated a tourism income multiplier of 0.34 and tourism output multiplier of 1.54 for the Lao PDR economy in 2008. Even in 1990, Khan, Seng and Cheong (1990) study showed an output multiplier of 2.0 and income multiplier of 0.94 of the tourism sector in Singapore, which are significantly higher than Lao PDR.

Table 4.16 Tourism output and income multipliers of selected countries.

Country	Multipliers		Sources
	Output	Income	
Turkey	1.52	2.03	Liu et al. (1984)
Yugoslavia	3.56	1.99	Janez (1979, cited in Liu et al. (1984)
Bermuda	2.66	1.22	Archer and Fletcher (1990) and Archer (1995)
Singapore	2.00	0.94	Khan, Seng and Cheong (1990)
Bahamas	2.25	0.88	Archer and Fletcher (1990)
Tanzania	1.59	0.85	Curry (1986)
Philippines	1.87	0.82	Santos et al. (1983) and Fletcher (1989)
Fiji	-	0.82	Curry (1986)
Nepal	-	0.72	Curry (1986)
Kenya	1.81	0.64	Summary (1987)
Korea	1.42	-	Song and Ahn ((1983 cited in Fletcher (1989)
Malta	0.86	0.56	Briguglio, Johnson and Thomas (1992)
Malaysia	1.41	0.35	Mazumder et al. (2009)
Lao PDR	1.54	0.34	Our study

A tourism impact study in Malaysia by Mazumder et al. (2009) derived multipliers close to our study's results; with output multipliers of 1.41 and input multiplier of 0.35 (see Table 4.16). Similarly, for the Philippines, Santos et al. (1983) and Archer (1990) reported a tourism output multiplier of 1.87 and a tourism income multiplier of 0.82. Stynes (1999) revealed that income and output multipliers are lower in countries that depend heavily on imported goods and services and higher in those that are relatively self-sufficient. Our study multipliers (output 1.54 and income 0.34) were less than other countries (see Table 4.16). For example, Turkey, Bermuda, Korea, Malaysia, Tanzania and Singapore are well developed and their tourism sectors are inter-linked with other economic sectors which relies more on domestic economy. On the other hand, Lao PDR has a centrally controlled close economy for a long time and the economic reform for the market economy has just begun in 2005. The agriculture and manufacturing sectors are subsistence in nature and mining and quarrying, forestry and logging and electricity and water supply have started to dominate the country's economy. The tourism sector's annual imports are increasing at 58 percent and the domestic production is

also increasing but at lower rate of 21 percent in the country impacting negatively in the output and income multiplier.

4.4.6 Employment in the economic sectors of the Lao PDR

Based on the employment data used by Asra et al. (2006) for 2003 and NSC (2008) for 2008, the total direct and indirect employment multipliers were computed for the economic sectors of the country. The employment multiplier measures the number of additional jobs created across all economic sectors of the country from a million dollar increase in the final demand of that sector (Stynes, 1997). The employment multiplier changes frequently since the increase in employees' wages and salaries over time will directly result in a lower number of jobs per output ratio (Jones, 1997).

Table 4.17 shows the employment multipliers of the economic sectors of the Lao PDR. The agriculture sector, on average, employed 94 people in direct and 30 people in indirect jobs in 2003 generating a total of 124 jobs per million dollars of output. Similarly, the industry sector used, on average, 40 people in direct jobs and 23 people in indirect jobs, a total of 63 jobs per million dollars of output in the same year. The employment multiplier results show that the service sector's average direct employment was 43 people whereas indirect employment was 15 people, both of which were higher than the average for the industry sector. For 2008, the results showed that agriculture provided, on average, a total of 138 jobs of which 104 were direct and 34 were indirect jobs.

The industry sector's total employment in 2008 was, on average, 41 of which 27 were direct and 14 were indirect jobs (see Table 4.17). A total of 71 people were employed in the service sector of which 50 were direct employees and 21 were indirect employees in 2008. Overall, the average for all economic sectors created 60 direct jobs (2003: 59) and 23 indirect jobs (2003: 23) with a total of 83 jobs (2003: 82) per million dollars of output in 2008. The results showed that no significant changes occurred in the total employment structure in the three major sectors (agriculture, industry and service) in the Lao PDR economy during 2003-2008.

However, the results showed changes in the intra-industry employment structure among the 14 economic sectors for the same period. The tourism sector created 68 jobs per million dollars of output as direct jobs in the country in 2008 compared with 75 in 2003 (see Table 4.17). Every US$1m of annual tourism receipts increased employment directly by 68 people and indirectly by 41 people generating a total employment of 109 in 2008. The indirect employment increased significantly from 28 jobs (2003) to 41 jobs (2008).

Table 4.17 Employment multipliers of the Lao PDR economic sectors, 2003 and 2008.

Economic sectors	2003			2008		
	Direct	**Indirect**	**Total**	**Direct**	**Indirect**	**Total**
Agriculture and livestock	0.111	0.037	0.148	0.103	0.043	0.146
Forestry and logging	0.077	0.022	0.099	0.104	0.024	0.128
Agriculture (average)	***0.094***	***0.030***	***0.124***	***0.104***	***0.034***	**0.138**
Mining and quarrying	0.009	0.006	0.015	0.009	0.008	0.017
Food and beverage manufacturing	0.105	0.058	0.163	0.040	0.016	0.056
Other manufacturing	0.024	0.014	0.038	0.030	0.017	0.047
Electricity and water supply	0.010	0.008	0.018	0.015	0.007	0.022
Construction	0.052	0.029	0.081	0.040	0.024	0.064
Industry (average)	***0.040***	***0.023***	***0.063***	***0.027***	***0.014***	**0.041**
Transport and communication	0.017	0.006	0.023	0.043	0.023	0.066
Wholesale and retail trade	0.038	0.012	0.050	0.048	0.012	0.060
Banking and finance	0.014	0.004	0.018	0.025	0.009	0.034
Real estate and business services	0.030	0.012	0.042	0.038	0.013	0.051
Public administration	0.032	0.017	0.049	0.037	0.015	0.052
Personal, social and comm. Serv.	0.051	0.011	0.062	0.043	0.013	0.056
Tourism	**0.075**	**0.028**	**0.103**	**0.068**	**0.041**	**0.109**
Services (average)	***0.043***	***0.015***	***0.058***	***0.050***	***0.021***	**0.071**

Source: Lao PDR 2003 and 2008 I-O Tables; NSC (2003, 2008) using SimSIP SAM Software

The indirect employment increment in the tourism sector indicates that the sector is substantially purchasing domestic products and also selling its products and services to the different sectors of the economy. Meanwhile, the decrease in direct employment in tourism sector per million dollars of output between 2003 and 2008 indicates a rising salary and wage structure in the country's tourism sector. However, the higher secondary effects of employment suggest that there was more employment generation in the tourism sector by indirect and induced impacts than by different sectors of the economy.

Based on the employment multiplier computed from the Lao PDR I-O models, the total employment for all economic sectors was computed for 2003 and 2008. Table 4.18 shows the total number of people employed by the economic sectors of the Lao PDR. In 2003, the agriculture and livestock sector directly employed the highest number of people (23,437 jobs) followed by the food and beverages manufacturing (11,631 jobs) and the forestry and logging (8,594 jobs) sector. Similarly, in 2008, the agriculture and livestock and the forestry and logging sectors dominated with 28,907 and 21,095 jobs, respectively, in the country.

Table 4.18 Number of employment by the economic sectors of the Lao PDR.

Economic sectors	Employees in numbers (2003)			Employees in numbers (2008)		
	Direct	Indirect	Total	Direct	Indirect	Total
Agriculture	**32,031**	**6,600**	**38,631**	**50,002**	**13,717**	**63,719**
Agriculture and livestock	23,437	4,150	27,587	28,907	8,730	37,638
Forestry and logging	8,594	2,450	11,044	21,095	4,987	26,082
Industry	**22,352**	**12,965**	**35,317**	**27,634**	**14,800**	**42,435**
Mining and quarrying	1,012	680	1,692	1,961	1,713	3,674
Food and beverages manufacturing	11,631	6,445	18,076	8,151	3,232	11,383
All other manufacturing	2,731	1,654	4,385	6,177	3,506	9,683
Electricity and water supply	1,182	940	2,122	3,161	1,472	4,633
Construction	5,795	3,246	9,041	8,184	4,878	13,062
Services	**27,058**	**9,734**	**36,792**	**66,454**	**28,807**	**95,260**
Transport and communication	1,925	709	2,634	8,771	4,702	13,473
Wholesale and retail trade	4,301	1,350	5,651	9,786	2,454	12,240
Banking and finance	1,573	536	2,109	5,091	1,961	7,052
Real estate and business services	3,399	1,432	4,831	7,783	2,687	10,470
Public administration	3,590	1,953	5,543	7,456	3,167	10,623
Personal, community and social services	5,687	1,254	6,941	8,728	2,638	11,367
Tourism	**6,582**	**2,500**	**9,082**	**18,838**	**11,198**	**30,036**
Grand total	**81,440**	**29,299**	**110,739**	**144,090**	**57,324**	**201,414**

Source: Lao PDR I-O Tables 2003 and 2008; National Statistics Centre (2003, 2008)

The tourism sector employed 6,582 people directly and 2,500 people indirectly and ranked as the fourth largest sector in providing employment in 2003 (see Table 4.18). However, in 2008, the tourism sector was the third largest sector, employing 18,838 people directly and 11,198 people indirectly. Tourism is a labour intensive sector and its projections for employment demand are important to cater for the business and personnel requirements fulfilling international visitors' needs in the Lao PDR. In 2008, the mining and quarrying was the lowest employment provider in the country with the 3,674 total jobs.

Table 4.19 summarizes the tourism employment for 2003 and 2008 in the Lao PDR. The tourism sector contributed eight percent of total employment in 2003 while the sector's contribution to direct employment increased to 13 percent in 2008. During this period, the average annual tourism employment growth rates of direct, indirect and total employment were 7.0, 4.5 and 6.0 percent, respectively. Comparing to the results of 2003 and 2008, the tourism sector created about 13,000 more jobs, on average 2,451 jobs per year, in the five year period. The results show the sector will create an additional 6,200 direct jobs during 2009-2013.

Table 4.19 Summary of the Lao PDR tourism employment in 2003 and 2008.

Employment description	Direct employment		Indirect employment		Total employment	
	Tourism	Lao PDR	Tourism	Lao PDR	Tourism	Lao PDR
Year 2003 (numbers)	6,582	81,440	2,500	29,299	9,082	110,739
Tourism jobs to total employment (%)	8.1		8.5		8.2	
Year 2008 (numbers)	18,838	144,090	11,198	76,324	30,036	201,414
Tourism jobs to total employment (%)	13.1		14.7		14.9	
Average annual increment (%) (tourism)	7.0		4.5		6.0	

Source: Own calculations

4.4.7 Forecasting tourism employment and outputs

One of the important advantages of the I-O model is forecasting outputs from the rest of the economic sectors that are considered useful and credible around the world (Bocoum, 2000). The projection of the tourism output required to satisfy new levels of final demand that will be demanded by the tourism sector in the Lao PDR were also computed. In this study, the change in total output of the tourism sector was computed as the product of the tourism final demand multiplier based on the 2008 Lao PDR I-O model and the change in the final demand of the tourism sector (projected) for the respective year from LNTA (2009).

Table 4.20 shows the change in the tourism final demand for successive years that impacts both on the change in the level of output and in generating cumulative additional jobs from 2011 to 2015 in the Lao PDR. If the final demand of the tourism sector is expected to increase the following year, then a new level of output of the different sectors is required to fulfil that demand. The study used 2008 as the base year to compute a new level of output and employment required. The tourism final demand is expected to increase by US$54m in 2011 in the Lao PDR.

Table 4.20 Cumulative final demand, new outputs and employment in the tourism sector in Lao PDR (million US$).

Year	Final demand	Total output change	New direct jobs (No.)	New indirect jobs (No.)	New total jobs (No.)
2011	54	83.50	1,921	752	2,672
2012	70	108.24	2,490	9,74	3,464
2013	85	131.44	3,023	1,183	4,206
2014	101	156.18	3,592	1,406	4,998
2015	117	180.92	4,161	1,628	5,789

Source: Own calculations
Note: *Based on average figure of total number of employment creation per million dollars of different sectors (Average of 2008; Direct 23, Indirect 9, Total 32 per million US$ output)

In 2011, the US$54m of tourism demand will trigger a further demand of US$83m in output from the different economic sectors in the country. Meanwhile, an additional 1,921 new direct and 752 new indirect jobs will be created to produce those outputs, bringing the total new employment to 2,672 in 2011 (see Table 4.20). Similarly, the results showed that the estimated tourism final demand of US$117m in 2015 will demand an additional US$181m outputs from different economic sectors creating 5,789 new jobs (4,161 direct and 1,628 indirect jobs) in the Lao PDR economy.

Table 4.21 shows that the total output required from the different economic sectors in the Lao PDR while having the new final demand of tourism from 2011 to 2015. In order to meet the new tourism final demand of US$54m, the 14 economic sectors of the Lao PDR will be required to produce an additional output of US$83.5m in 2011. Of this, the tourism sector itself must produce US$55.7m of products followed by US$5.6m from agriculture and livestock, US$5.5m from wholesale and retail trade, US$2.4m from construction and US$2.6m from the food and beverages manufacturing sectors as their respective additional outputs in the economy in 2011, respectively.

Similarly, for 2015, an additional output of US$180.9m must be produced by the different economic sectors to meet the new tourism demand of US$117m (see Table 4.21). Tourism

itself must produce US$120.7m followed by US$12.1m from agriculture and livestock, US$11.9m from wholesale and retail trade, US$5.3m from construction and US$5.7m from the food and beverages manufacturing sectors as their respective additional outputs to address the tourism demand in 2015 in the Lao PDR economy.

Table 4.21 New output levels of the economic sectors of the Lao PDR (million US$).

Economic sectors	Change in output of all economic sectors				
	2011	**2012**	**2013**	**2014**	**2015**
Agriculture and livestock	5.57	7.22	8.76	10.41	12.06
Forestry and logging	2.65	3.44	4.17	4.96	5.75
Mining and quarrying	0.63	0.82	1.00	1.19	1.37
Food and beverages manufacturing	2.66	3.45	4.18	4.97	5.76
Other manufacturing	2.09	2.71	3.29	3.90	4.52
Electricity and water supply	0.98	1.28	1.55	1.84	2.13
Construction	2.44	3.16	3.84	4.56	5.28
Transport and communication	0.62	0.80	0.97	1.16	1.34
Wholesale and retail trade	5.50	7.13	8.66	10.29	11.92
Banking and finance	2.01	2.61	3.17	3.76	4.36
Real estate and business services	1.16	1.50	1.82	2.16	2.51
Public administration	0.88	1.15	1.39	1.65	1.91
Personal, social and community services	0.59	0.76	0.93	1.10	1.28
Tourism	**55.72**	**72.23**	**87.71**	**104.22**	**120.73**
Tourism (new final demand)*	**54.0**	**70.0**	**85.0**	**101.0**	**117.0**
Change in total outputs	**83.50**	**108.24**	**131.44**	**156.18**	**180.92**

Note: *Changes in tourism final demand for 2011-15 are the projected values of the Lao PDR for the respective years. These figures were derived from the 2008 Statistical Report on Tourism of Lao PDR.

4.5 Chapter summary

In this chapter the international visitors' demographic profile, expenditure by spending category, economic multiplier analysis and total economic impacts of the Lao PDR tourism sector were estimated and presented. Between 2003 and 2008, visitor arrivals and receipts increased significantly in the country. The average amount spent by the visitors was US$246 per trip with an average daily expenditure of about US$36. The results showed that nearly one third of the total arrivals in the Lao PDR were from Thailand. In addition, 56 percent of the total arrivals were from the GMS countries and contributed 40 percent to the total tourism receipts. Europe, North America, other SEA, the Pacific and East Asian countries shared 40 percent of the total arrivals and 56 percent of the total receipts in the country. In 2008, the tourism sector's contribution increased significantly to 7.5 percent of the country's GDP compared with 3.5 percent in 2003. In terms of employment, the tourism sector ranked third in 2008 and provided about 13 percent of the total employment. The tourism sector created an average of 2,451 additional direct jobs per year during 2003-2008. Overall, tourism brought

direct revenue to the hoteliers, retail trade, restaurants and other services and stimulated the increase in output, households' income and employment opportunities in the economy.

Both normal and ratio multipliers were higher for the tourism sector in 2008 than other economic sectors in the country. Similarly, in 2008, the sector achieved relatively higher ratio multipliers than in 2003. Tourism ranked third and attained a higher output multiplier in 2008 than in 2003 and the sector is assuming a key role in output generation as the visitors' expenditure generated 1.54 dollars of output multiplier for every dollar spent. The results showed relatively large values for the secondary impacts of the tourism sector in the economy. Overall, the results showed that the economic multipliers for the service sectors were higher than the agriculture and manufacturing sectors in the Lao PDR economy.

The results show that the tourism economic multipliers varied with different characteristics such as economic sector, visitors' spending categories and period studied. Lao PDR tourism has created significant employment, income, value added and output growth in the primary and secondary sectors through multiplier effects. The World Tourism Organization (1981) and Tisdell (1998) reported that the major criticism in using the multipliers approach to analyse tourism's impact is that it ignores the opportunity cost of resources and the factors of production that would be diverted from other users. However, the multipliers are suitable for the estimation of the economic impacts of increased visitors' expenditure and their impacts on different sectors (Butcher, Fairweather, & Simmons, 2003; Frechtling & Horvath, 1999).

Chapter 5
Interdependency and Linkages Analysis: Results and Dicussion

This chapter presents and discusses the results from the Lao PDR 2003 and 2008 I-O models of the interdependency and inter-industry linkages of the tourism sector to the different economic sectors. Section 5.1 presents the estimated total income and expenditure of the economic sectors and the economic sectors' dependency on intermediate activities, value added and the rest of the world (exports and imports). Section 5.2 discusses the results of the different approaches of the linkage analysis such as total inter-industry linkage, standard backward and forward linkage, pure linkage, weighted linkage, and Multiplier Product Matrix of the Lao PDR economy for the study years. Section 5.3 presents the self-sufficiency rate of the economic sectors followed by the overall key sector analysis using the Multi Rank Index approach in section 5.4. Section 5.5 summarizes the study results.

5.1 Interdependency based on the income and expenditure of the Lao PDR economy

Table 5.1 shows the country's economic sector income as a percentage of total income in 2003 and 2008. The tourism sector's income contributions were 34 percent from intermediate activities, 49 percent from value added and about 17 percent income was generated by exports with a total value of US$87m in 2003. The tourism sector ranked 10th. The sector ranking was based on the total volume of production (including household consumption, government expenditure, gross fixed capital formation and changes in inventories).

The agriculture and livestock sector's total income was 60 percent from intermediate activities and 37 percent from value added in 2003. Only three percent of this sector's products were exported to different countries with a total value of US$1,083m (see Table 5.1). Similarly, the food and beverages manufacturing sector's intermediate activities contributed 13 percent and value added 76 percent with exports contributing 11 percent to the total income in 2003. This sector ranked second with a total value of US$1,021m. In 2008, the tourism sector's total income contributions were 36 percent from intermediate activities, 53 percent from value added and only about 11 percent from exports (see Table 5.1). In 2008, the mining and quarrying sector and the forestry and logging sector had significantly higher income from exports with 81 percent (out of a total value of US$425m) and 44 percent (out of a value of US$486m), respectively.

Table 5.1 Comparison of the income of different economic sectors in the Lao PDR as a percentage of total income in 2003 and 2008.

Value in million US$

Economic sector	2003					2008				
	Activities (%)	GVA (%)	ROW (%)	Total value	Rank (2003)	Activities (%)	GVA (%)	ROW (%)	Total value	Rank (2008)
Agriculture and livestock	60.14	37.11	2.75	1,083.2	1	37.43	54.83	7.74	1,216.1	1
Forestry and logging	13.63	44.67	41.7	146.5	8	22.19	33.46	44.35	486.7	4
Mining and quarrying	2.83	20.25	76.92	181.9	6	10.88	8.2	80.92	425.1	6
Food and beverages manufacturing	12.64	76.34	11.02	1,021.2	2	19.68	67.41	12.91	669.4	3
All other manufacturing	74.71	14.84	10.45	165.8	7	26.42	52.49	21.09	459.7	5
Electricity and water supply	32.47	49.59	17.94	54.9	13	38.29	18.71	43.00	204.3	14
Construction	13.69	74.8	11.51	405.2	3	20.82	63.97	15.21	391.0	7
Transport and communication	51.25	34.64	14.11	39.4	14	26.94	62.65	10.41	299.8	10
Wholesale and retail trade	53.21	35.94	10.85	269.2	4	38.69	57.23	4.08	786.5	2
Banking, finance and insurance	54.17	27.86	17.97	58.8	12	49.14	42.32	8.54	305.4	8
Real estate and business services	19.91	62.6	17.49	78.3	11	22.26	60.81	16.93	248.6	12
Public administration	15.60	81.79	2.61	98.8	9	12.75	81.46	5.79	352.1	9
Personal, community and social services	18.63	73.98	7.39	230.6	5	21.29	60.43	18.28	234.2	13
Tourism	**34.17**	**49.26**	**16.57**	**87.9**	**10**	**35.94**	**53.22**	**10.84**	**275.9**	**11**

Source: Lao PDR I-O Tables 2003 and 2008 calculations using SimSIP SAM Software
Note: The strongest/highest value sector was ranked 1 and the least as 14.
ROW = Rest of the world
GVA = Gross Value Added
Activities = Intermediate activities

In 2008, the agriculture and livestock sector ranked first with a total income of 37 percent from intermediate activities and 55 percent from the value added (see Table 5.1). The remaining eight percent of this sector's products were exported to other countries with a total income of US$1,216m. The wholesale and retail trade sector was ranked second with a total value of US$786m in 2008 of which 39 percent was from intermediate activities, 57 percent from value added and four percent from exports.

Table 5.2 shows the sector expenditure as a percentage of the total expenditure in the Lao PDR in 2003 and 2008. The tourism sector's total expenditure comprised 30 percent from intermediate activities, 35 percent from value added and another 35 percent from imports from other countries giving a total value of US$87m in 2003. The agriculture and livestock sector's total expenditure (US$1,083m) was contributed by intermediate activities (26%), value added (62%) and imports (11%) in the same year.

In terms of the food and beverages manufacturing sector, intermediate activities contributed 45 percent and value added 25 percent to the total income of the sector in 2008 (see Table 5.2). The sector had a total value of US$669m and ranked third in the total income. Imports (31%) had increased for this sector in 2008 compared with 2003 (<15 percent). The lowest imports were in the electricity and water supply, about six percent in 2003. The tourism sector's total expenditure comprised 29 percent from intermediate activities, 28 percent from value added and another 43 percent from imports from other countries giving a total value of US$275.9m in 2008.

Similarly, imports also made a significant contribution to total expenditure in 2008 in the country's economy. For example, 52 percent was contributed by imports in the construction sector, 43 percent in the tourism sector and 40 percent in the personal, social and community services sector of the total expenditures (see Table 5.2). The lowest imports in 2008 were in the electricity and water supply sector with about two and half percent followed by 12 percent in the mining and quarrying sector.

Table 5.2 Comparison of expenditure of different economic sectors in the Lao PDR as a percentage of total expenditure in 2003 and 2008.

Value in million US$

Economic sectors	2003					2008				
	Activities (%)	GVA (%)	ROW (%)	Total value	Rank	Activities (%)	GVA (%)	ROW (%)	Total value	Rank
Agriculture and livestock	26.41	62.17	11.43	1,083.2	1	26.52	54.8	18.68	1,216.1	1
Forestry and logging	21.58	55.96	22.45	146.5	8	23.54	58.1	18.36	486.7	4
Mining and quarrying	32.08	52.08	15.84	181.9	6	28.44	59.32	12.23	425.1	6
Food and beverages manufacturing	57.41	28.17	14.42	1021.2	2	44.58	24.5	30.92	669.4	3
All other manufacturing	20.84	46.4	32.76	165.8	7	28.85	35.66	35.49	459.7	5
Electricity and water supply	37.4	56.63	5.97	54.9	13	52.24	45.34	2.42	204.3	14
Construction	13.26	51.49	35.24	405.2	3	22.96	25.4	51.64	391.0	7
Transport and communication	33.07	34.35	32.57	39.4	14	27.87	21.76	50.37	299.8	10
Wholesale and retail trade	9.88	57.9	32.22	269.2	4	30.29	34.53	35.18	786.5	2
Banking, finance and insurance	17.97	60.63	21.4	58.8	12	21.1	36.34	42.56	305.4	9
Real estate and business services	13.27	68.73	17.99	78.3	11	26.64	43.91	29.45	248.6	12
Public administration	20.47	59.14	20.39	98.8	9	27.14	47.23	25.62	352.1	8
Personal, community and social services	14.78	45.45	39.77	230.6	5	23.52	36.4	40.08	234.2	13
Tourism	**30.01**	**35.09**	**34.9**	**87.9**	**10**	**28.6**	**27.99**	**43.41**	**275.9**	**11**

Source: Lao PDR I-O Tables 2003 and 2008 calculations using SimSIP SAM Software
Note: The strongest/highest value sector was ranked 1 and the least as 14.
ROW = Rest of the world
GVA = Gross Value Added
Activities = Intermediate activities

5.2 Computation of inter-industry linkages of the economic sectors of Lao PDR

5.2.1 Inter-industry linkage analysis using Chenery-Watanabe approach

Table 5.3 shows the total inter-industry linkages (backward and forward linkages) by the Chenery-Watanabe approach for 2003 and 2008 in the Lao PDR economy. The total inter-industry linkages show that agriculture and livestock ranked first (3.439); food and beverages manufacturing ranked second (3.329); wholesale and retail trade ranked third (2.716); and tourism ranked fourth (2.694) as the sectors achieving the highest total inter-industry linkage values in 2003. The highest value of the inter-industry linkage shows the sector is strongest among all the economic sectors. The results also revealed that the total inter-industry linkages of the wholesale and retail trade (3.442); tourism (2.921); mining and quarrying (2.781); forestry and logging (2.771); and electricity and water (2.694) sectors were the most improved sectors in 2008 (see Table 5.3). They achieved higher inter-industry linkages than in 2003. Agriculture and livestock (3.421) and the food and beverages manufacturing (2.940) sectors ranked second and third in the total inter-industry linkages before tourism sector in 2008.

The tourism sector ranked fourth in 2003 with 2.694 and in 2008 with 2.921, in the total inter-industry linkages among the 14 economic sectors of the Lao PDR (see Table 5.3). Thus the total inter-industry linkages of the tourism sector increased significantly in 2008 compared with 2003. The results showed that the tourism sector together with the other three economic sectors achieved a significant increment in the total inter-industry linkages value in 2008 compared with 2003. These sectors are tourism (+0.14); forestry and logging (+0.17); mining and quarrying (+0.25); and wholesale and retail trade (+0.29). The difference in the tourism inter-industry linkages value (+0.14) indicates that the tourism sector's interactions with other economic sectors increased by 14 percent during the five years. In other words, the tourism sector generated 14 cents more domestically as linkage effects in 2008 than in 2003 from a dollar's expenditure by a visitor. Considering only the forward linkages, the tourism sector had relatively weaker forward linkages than backward linkages in both years because of its considerable share of sales going to visitors as final demand for personal consumption.

Kula (2008) identified that the Chenery-Watanabe backward linkages are simply the column sums of the input coefficients matrix and the forward linkages are the row sums of the output coefficients matrix. The inter-industry linkages approach developed by Chenery and Watanabe (1958) represents both the direct and indirect capacity of the services to increase economic activity throughout the economy following an increase in their own demand.

Table 5.3 Total inter-industry or backward and forward linkages (Chenery-Watanabe approach) of the Lao PDR economic sectors.

Economic sectors	2003						2008						Differences (+/-)
	BL	Rank	FL	Rank	TL	Rank	BL	Rank	FL	Rank	TL	Rank	
Agriculture and livestock	1.3942	4	2.0448	1	3.4390	1	1.3828	8	2.0388	1	3.4216	2	-0.011
Forestry and logging	1.1610	12	1.2204	7	2.3814	11	1.3326	11	1.4389	4	2.7715	7	+0.173
Mining and quarrying	1.1562	13	1.0052	14	2.1614	14	1.4125	5	1.3692	7	2.7817	6	+0.258
Food and beverage manufacturing	1.9296	1	1.4004	3	3.3299	2	1.6182	1	1.3226	8	2.9409	3	-0.309
All other manufacturing	1.2548	7	1.3741	4	2.6289	6	1.4005	7	1.2986	10	2.6992	11	+0.160
Electricity and water supply	1.3415	5	1.1113	13	2.4528	8	1.5766	2	1.2411	11	2.8176	5	+0.277
Construction	1.1641	11	1.1362	12	2.3003	13	1.3245	13	1.3698	6	2.6943	10	+0.159
Transport and communication	1.4477	2	1.1966	10	2.6442	5	1.4027	6	1.3080	9	2.7107	9	-0.003
Wholesale and retail trade	1.1380	14	1.5789	2	2.7169	3	1.4328	4	2.0099	2	3.4426	1	+0.297
Banking and finance	1.2238	8	1.1842	11	2.4080	10	1.2912	14	1.4541	3	2.7453	8	+0.093
Real estate and business services	1.1653	10	1.2126	8	2.3779	12	1.3796	9	1.2343	12	2.6139	12	+0.216
Public administration	1.2592	6	1.1907	9	2.4499	9	1.3756	10	1.1712	14	2.5468	13	+0.119
Personal, community and social services	1.1850	9	1.2997	5	2.4847	7	1.3298	12	1.1740	13	2.5037	14	+0.153
Tourism	**1.4144**	**3**	**1.2799**	**6**	**2.6943**	**4**	**1.5464**	**3**	**1.3754**	**5**	**2.9217**	**4**	**+0.149**
Minimum	1.1380		1.0052		2.1614		1.2912		1.1712		2.5037		
Maximum	1.9296		2.0448		3.4390		1.6182		2.0388		3.4426		

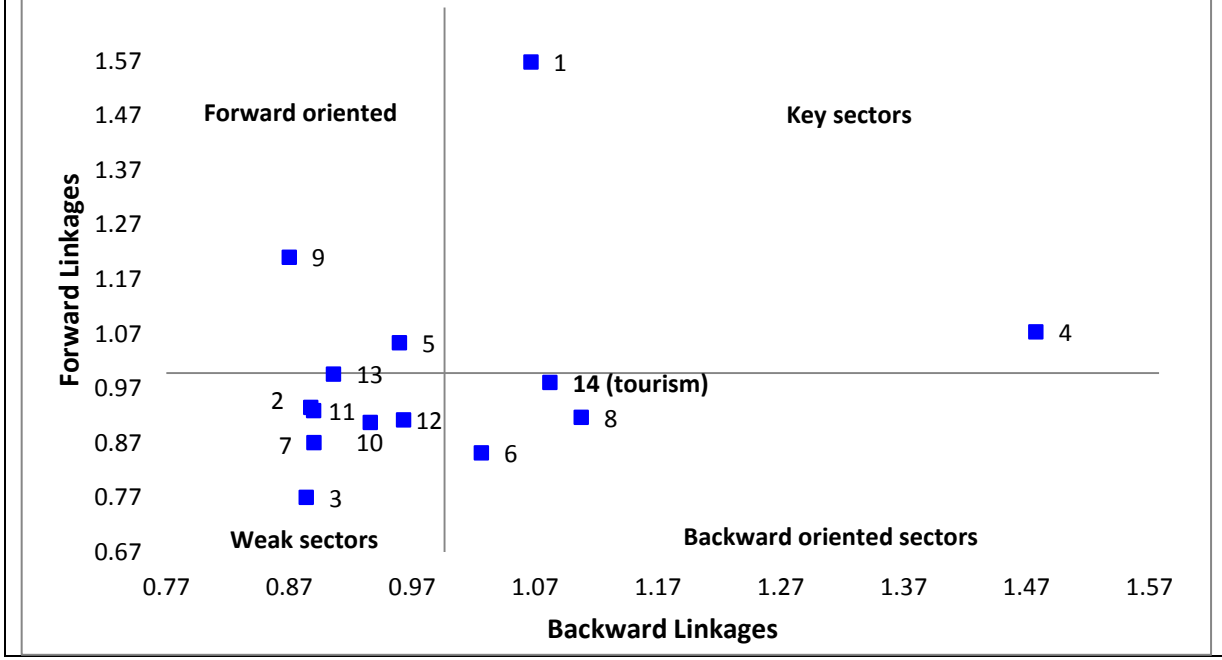
Note: The Chenery-Watanabe backward linkages are simply the column sums of the input coefficients matrix and forward linkages are the row sums of output coefficients matrix (Kula, 2008). The strongest/highest value sector is ranked 1 and the least as 14.
BL =Backward linkages (Row sum of I-O coefficients)
FL = Forward linkage (Column sum of I-O coefficients)
TL = Total linkage (sum of backward and forward linkage values)

Vavrla and Rojicek (2006) found that the industry with the highest value in backward linkages represents the industry with the highest effect on the demand for domestic production thus backward linkages are demand oriented. Arabsheibani and Delgado-Aparicio (2002) explained that weak backward and forward linkages between sectors indicate that the economy is poorly integrated and heavily dependent on imports. Similarly, strong backward and forward linkages show the sector's high importance to the economy (Meijerink & Roza, 2007).

5.2.2 Analysis of linkages using the Rasmussen-Hirschman approach

Figure 5.1 shows the importance of the economic sectors based on the backward and forward linkages by the Rasmussen-Hirschman approach in the 2003 economy. The economic sectors were divided into four categories to classify their importance in the economy such as key sectors, backward oriented sectors, forward oriented sectors and weak sectors in each of the four quadrants. The results showed that the food and beverages manufacturing, and agriculture and livestock sectors were the key sectors in 2003. The tourism sector exhibited strong backward linkages along with transport and communication and the electricity and water supply sectors, which were classified as backward oriented sectors. These sectors' high backward linkage indices show the interconnection of various sectors from which these sectors purchased greater amounts of various inputs from the domestic economy in the country.

Similarly, the wholesale and retail trade; other manufacturing; and personal, community and social services were forward oriented sectors (see Figure 5.1). These sectors' higher forward linkages indicate the interconnections of direct and indirect output providers between sectors in the industries. The rest of the sectors were classified as weak sectors in the 2003 economy. Bocoum (2000) reported that the highest forward linkage value of a sector indicates that the sector stimulates greater output production in different sectors of the country's economy and vice versa.



Legend

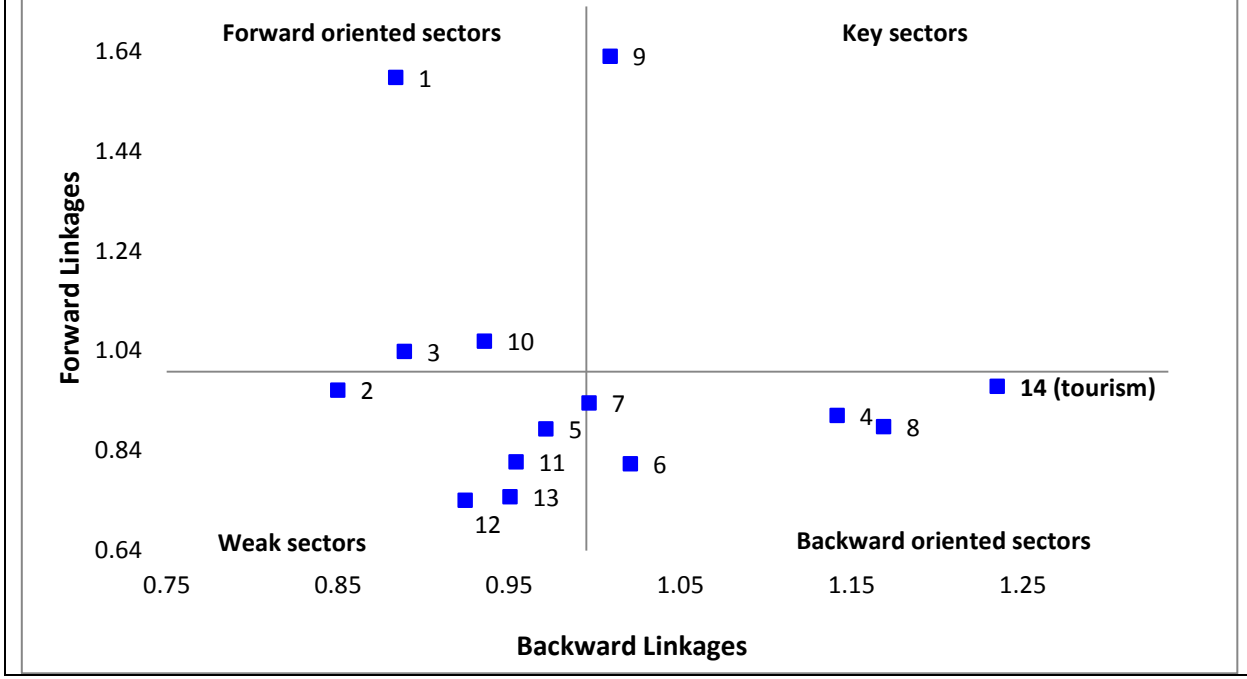
Sector No.	Economic sector description
1	Agriculture and livestock
2	Forestry and logging
3	Mining and quarrying
4	Food and beverage manufacturing
5	All other manufacturing
6	Electricity and water supply
7	Construction
8	Transport and communication
9	Wholesale and retail trade
10	Banking and finance
11	Real estate and business services
12	Public administration
13	Personal, community and social services
14	Tourism

Figure 5.1 The backward and forward linkages in the Lao PDR economy in 2003.

Figure 5.2 shows the backward and forward linkages of the Lao PDR economy in 2008. The wholesale and retail trade sector was the only key sector in 2008. The tourism sector was the strongest backward oriented sector in the economy followed by electricity and water supply, transport and communication, construction and the food and beverages manufacturing sectors. These sectors with high backward linkages have a higher dependency on intermediate goods, which are typically capital intensive. Additionally, the tourism sector showed relatively high indices of the power of dispersion indicating higher backward linkage effects that result in higher output multipliers in the country's economy. Agriculture and livestock; mining and quarrying; and banking and finance became forward oriented sectors (see Figure 5.2). The rest of the sectors were weak sectors in 2008.

Tourism along with food, beverage and manufacturing, agriculture and livestock, wholesale and retail trade are the four common key sectors for both years. Transport and communication became a key sector in 2003 while mining and quarrying sector in 2008. This is because the mining and quarrying sector had an outstanding production in 2008 and was the biggest jump during the five years period. Transport and communication sector was the biggest surprise as the sector is dominated by the foreign investors, lower level of intermediate activities and sales as proportion of their gross output in the country. As a result the tourism sector has higher income leakages from the country. The values of the backward linkages have substantially improved which shows the tourism sector is consuming more products domestically in 2008 than in 2003. Similarly, the tourism imports have increased in a greater rate in 2008 than in 2003. The reason behind this increase is that the domestic production increased by 21 percent annually while tourism imports increased by 58 percent annually in the economy during 2003-2008.

Reis and Rua (2006) termed backward linkage as the output multiplier, which measures the effects of one monetary unit change in the final demand for each sector on total output of all sectors (including the sector itself). The sector with the higher value in backward linkages represents the sector with the greater effect on the demand for domestic production. Therefore, backward linkages are demand oriented (Drejer, 2003; Eurostat, 2008). The backward linkage (in percentage terms) of a sector quantifies the change in the economy-wide income relative to the average change in the economy caused by a unitary injection in the final demand of that particular sector (Parra & Wodon, 2008, p.61).



Legend

Sector No.	Economic sector description
1	Agriculture and livestock
2	Forestry and logging
3	Mining and quarrying
4	Food and beverage manufacturing
5	All other manufacturing
6	Electricity and water supply
7	Construction
8	Transport and communication
9	Wholesale and retail trade
10	Banking and finance
11	Real estate and business services
12	Public administration
13	Personal, community and social services
14	Tourism

Figure 5.2 The backward and forward linkages in the Lao PDR economy in 2008.

Jones (1976) termed forward linkage as the input multiplier, which measures the effects of one monetary unit change in primary inputs of each sector on total output of all sectors (including the sector itself). The higher the value of the forward linkages of a given sector the greater will be the impact of a price increase in this sector on the price levels in the economy. Therefore, forward linkages are supply oriented (Drejer, 2003; Eurostat, 2008). Parra and Wodon (2008, p.61) explained that the forward linkage (in percentage terms) of a sector quantifies the change in the income in that sector relative to the average change in the economy caused by a unitary injection in the final demand of all sectors.

Parra and Wodon (2008) documented that a sector can be considered a key sector of an economy when its backward and/or forward linkage is greater than one. The authors further reported that if none of the linkages is greater than one, the sector is assumed to be a weak sector in that economy. However, Andreosso-O'Callghan and Yue (2004) argued that if the values of both the backward and forward linkage indicators of a sector are above the corresponding averages, the sector is a key sector in the economy.

Table 5.4 shows the differences in the linkage values between 2003 and 2008 in the 14 economic sectors of the Lao PDR. In 2003, the tourism sector was ranked third highest in backward linkages with an index of 1.093 but ranked fifth in forward linkages (0.972) among the economic sectors in the same year. The tourism sector (with a value of 1.240) along with transport and communication; food and beverages manufacturing; tourism and the wholesale and retail trade sectors obtained higher backward linkages in the economy in 2008. Based on the value of the forward linkages, the tourism sector achieved 0.970 for forward linkages (close to 1) and nearly qualified as key sector and ranked fifth in 2008.

Table 5.4 Backward and forward linkages of Lao PDR economic sectors, 2003 and 2008.

Economic sectors	Backward linkages		Difference	Forward linkages		Difference
	2003	2008		2003	2008	
Agriculture and livestock	0.977	0.889	-0.088	1.441	1.589	+0.148
Forestry and logging	0.942	0.855	-0.087	1.017	0.963	-0.054
Mining and quarrying	0.998	0.894	-0.104	0.968	1.040	+0.072
Food and beverages manufacturing	1.144	1.146	+0.002	0.935	0.912	-0.023
All other manufacturing	0.990	0.977	-0.013	0.918	0.885	-0.033
Electricity and water supply	1.114	1.026	-0.088	0.877	0.815	-0.062
Construction	0.936	1.002	+0.066	0.968	0.937	-0.031
Transport and communication	0.992	1.174	+0.182	0.925	0.889	-0.036
Wholesale and retail trade	1.013	1.014	+0.001	1.421	1.631	+0.210
Banking and finance	0.913	0.941	+0.028	1.028	1.061	+0.033
Real estate and business services	0.975	0.959	-0.016	0.872	0.819	-0.053
Public administration	0.972	0.929	-0.043	0.828	0.742	-0.086
Personal, community and social services	0.940	0.955	+0.015	0.830	0.749	-0.081
Tourism	**1.093**	**1.240**	**+0.147**	**0.972**	**0.970**	**-0.002**

Source: Lao PDR I-O analysis using SimSIP SAM Software

Tourism was one of the four sectors that had a backward linkage index value greater than one for both years along with the food and beverages manufacturing, electricity and water supply, and wholesale and retail trade (see Table 5.4). This implies that the power as a purchaser of inputs of the four sectors had increased greater than the average of all sectors in the economy. High backward linkage values indicate that these sectors have a greater influence on the purchase of inputs from all sectors of the economy and vice versa (Sonis et al., 1995). The sectors that have a forward linkage index value greater than one for both years were agriculture and livestock, wholesale and retail trade, and banking and finance. This indicates that these sectors provided their outputs to a wide range of sectors and their influence on the economy as suppliers was greater than the average of all sectors in the economy.

Secretario et al. (2009) computed the backward and forward linkage values of the hotel and restaurant sector as follows: Cambodia: 1.30 and 0.97; Thailand: 1.16 and 0.72 and Vietnam: 1.05 and 0.75, respectively. The low value of the forward linkages of the tourism sector (low indices of sensitivity) indicates that the output of the sector's products goes mainly to the personal and final consumption and the sector is more service oriented in the current study. The food and beverages manufacturing (1.144) had the highest backward linkages index followed by the electricity and water supply sector with an index of 1.114 (see Table 5.4). The banking and finance sector was the lowest sector in backward linkages in 2003 (0.913). In terms of forward linkages, the wholesale and retail trade (1.63) and agriculture and livestock (1.58) ranked number two as the most important sectors in the Lao PDR economy in 2008.

In terms of backward linkages, transportation and communication (0.18), tourism (0.14), construction (0.06), banking and finance (0.02), personal, social and community services (0.02), food and beverages manufacturing (0.01), and the wholesale and retail trade (0.01) sectors achieved higher backward linkages in 2008 than in 2003 in the country (see Table 5.4). The other sectors had negative growth in backward linkages for the study period. For forward linkages, the wholesale and retail trade (0.21), agriculture and livestock (0.14), mining and quarrying (0.07), and banking and finance (0.03) were the four sectors that obtained higher forward linkages in 2008 compared with 2003. The tourism sector's forward linkage value remained virtually the same during the study period (a decrease of only -0.001).

Table 5.5 shows the total linkage values of the economic sectors of the Lao PDR for 2003 and 2008. Total linkages were obtained by adding the backward and forward linkages of each sector, which represents both the direct and indirect capacity of the services to increase economic activity throughout the country's economy following an increase in their own

demand. In terms of total linkages, wholesale and retail trade (2.43), agriculture and livestock (2.41), food and beverages manufacturing (2.07) and the tourism (2.06) sectors have the highest total linkages in 2003 among the 14 economic sectors of Lao PDR. The electricity and water supply (1.99), mining and quarrying (1.96), forestry and logging (1.95), and banking and finance (1.94) sectors were average sectors in 2003. The remaining six sectors were considered weak sectors in the economy in the same year.

Table 5.5 Total linkage indices of the economic sectors of Lao PDR, 2003 and 2008.

Economic sectors	TL (2003)	Rank	TL (2008)	Rank
Agriculture and livestock	2.419	2	2.478	2
Forestry and logging	1.959	7	1.818	11
Mining and quarrying	1.966	6	1.934	8
Food and beverages manufacturing	2.079	3	2.058	5
All other manufacturing	1.908	10	1.861	9
Electricity and water supply	1.992	5	1.840	10
Construction	1.904	11	1.938	7
Transport and communication	1.916	9	2.063	4
Wholesale and retail trade	2.433	1	2.645	1
Banking, finance and insurance	1.941	8	2.001	6
Real estate and business services	1.848	12	1.778	12
Public administration	1.800	13	1.671	14
Personal, community and social services	1.770	14	1.704	13
Tourism	**2.065**	**4**	**2.210**	**3**

Source: Lao PDR I-O tables using SimSIP SAM software
Note: The strongest/highest value obtained sectors are ranked 1 and the least as 14.
TL = Total Linkages

Cella (1984) used the total linkage perspective to show sectors that might be key in developing macro level competitiveness. The aggregation of backward and forward linkages provides an alternative basis for comparison and the sector(s) which has(have) the greatest value of the total linkages are considered key sectors in the economy. The tourism sector (2.21) along with wholesale and retail trade (2.64), agriculture and livestock (2.47), and the transport and communication (2.06) sectors achieved higher total linkages values among the economic sectors in Lao PDR in 2008 (see Table 5.5). The banking and finance, food and beverages manufacturing, construction and mining and quarrying sectors obtained higher linkages values than the average of all sectors' value in 2008. The rest of the economic sectors achieved the lower values of linkages than the average value of all sectors in 2008.

Tables 5.6 and 5.7 show the key sectors of Lao PDR economy in 2003 and 2008, respectively, based on the backward and forward linkage values. In 2003, the tourism sector together with

agriculture and livestock, food and beverages manufacturing, wholesale and retail trade, and the banking and finance sectors qualified as key sectors in the Lao PDR economy (see Table 5.6).

Table 5.6 Key sectors of the Lao PDR economy in 2003.

Key sectors	Backward oriented sectors
Agriculture and livestock	Electricity and water supply
Food and beverages manufacturing	Forestry and logging
Wholesale and retail trade	Mining and quarrying
Tourism	
Banking, finance and insurance	
Forward oriented sectors	**Weak sectors**
All other manufacturing	Real estate and business services
Transport and communication	Public administration
Construction	Personal, social and community services

The transport and communication sector was added as a key sector to the five key sectors of 2003 in the Lao PDR economy in 2008 (see Table 5.7). The key sectors imply that the power of purchaser of inputs and sellers of output of these sectors had increased more than the average of all economic sectors in the respective years in the economy. The electricity and water supply, forestry and logging, and mining and quarrying sectors were backward oriented sectors in 2003 whereas the forestry and logging and other manufacturing sectors were backward oriented in 2008 (see Tables 5.6 and 5.7). This implies that the power as purchaser of input requirements of these sectors had increased more than the average of all sectors in the Lao PDR economy.

Table 5.7 Key sectors of the Lao PDR economy in 2008.

Key sectors	Backward oriented sectors
Agriculture and livestock	Forestry and logging
Food and beverages manufacturing	All other manufacturing
Wholesale and retail trade	
Tourism	
Banking, finance and insurance	
Transport and communication	
Forward oriented sectors	**Weak sectors**
Construction	Real estate and business services
Mining and quarrying	Public administration
Electricity and water supply	Personal, social and community services

The sectors possessing stronger forward linkages were other manufacturing, transport and communication, and construction in 2003 whereas the construction, mining and quarrying, and electricity and water supply sectors possessed stronger forward linkages in 2008. This shows that these sectors provided their output to a wide range of sectors and their influence on the economy was greater than the average of all sectors in the Lao PDR economy. The sectors possessing weak backward and forward linkages were real estate and business services, public administration, and personal, social and community services for both years (see Tables 5.6 and 5.7). Therefore, these sectors can be considered weak sectors in the economy.

5.2.3 Analysis of the weighted linkages of Lao PDR economic sectors

Table 5.8 shows the values of the weighted backward and forward linkages of the 14 economic sectors of the Lao PDR economy for 2003 and 2008. The tourism sector registered a weighted total linkages value of 1.52 and ranked eighth, of which backward linkages and forward linkages contributed 0.88 and 0.64, respectively, in 2003. The sector moved up to sixth position in the economy in 2008 with weighted total linkages value of 1.42 (backward linkages: 0.72, forward linkages: 0.70). It is evident that for the weighted backward and forward linkages, agriculture and livestock ranked first in total linkages (4.99 and 7.84) for both 2003 and 2008.

In 2003, the wholesale and retail trade sector obtained a total linkage value of 3.32, which ranked second followed by food and beverages manufacturing, with the value of 3.20, among the different economic sectors in the Lao PDR (see Table 5.8). The real estate and business services and personal, social and community services sectors were the least influential sectors and ranked 13th and 14th, respectively, based on the weighted total linkages in 2003. Similarly, in 2008, the real estate and business services and banking and finance sectors were the least valued sectors based on weighted total linkages; they ranked 13th and 14th among the economic sectors in the economy respectively.

Drejer (2003) argued that introducing weights while computing linkages is an investment induced approach to identify the key sectors. Weights were allocated to the economic sectors based on their volume of production while calculating the weighted backward and forward linkages. The weighted linkages indicate the aggregate income shares as weights of the economic sector (Parra & Wodon, 2008). The weighted total linkages were also computed in this study by adding both weighted backward and forward linkages during the study period.

Table 5.8 Weighted backward and forward linkages in the Lao PDR economy in 2003 and 2008.

Economic sectors	2003			Rank	2008			Rank
	WBL	WFL	WTL		WBL	WFL	WTL	
Agriculture and livestock	2.144	2.847	4.992	1	3.154	4.692	7.846	1
Forestry and logging	0.964	0.998	1.962	4	0.509	0.458	0.966	9
Mining and quarrying	0.954	0.899	1.853	6	0.548	0.454	1.002	8
Food and beverages manufacturing	1.864	1.344	3.209	3	4.347	3.051	7.398	2
All other manufacturing	0.955	0.994	1.950	5	0.546	0.917	1.462	5
Electricity and water supply	0.702	0.495	1.197	12	0.352	0.199	0.551	12
Construction	0.788	0.795	1.583	7	1.083	1.055	2.138	3
Transport and communication	0.673	0.645	1.318	11	0.415	0.173	0.588	11
Wholesale and retail trade	1.427	1.899	3.326	2	0.767	1.145	1.912	4
Banking and finance	0.621	0.818	1.439	9	0.234	0.257	0.491	14
Real estate and business services	0.622	0.506	1.128	13	0.253	0.250	0.503	13
Public administration	0.781	0.645	1.425	10	0.395	0.300	0.694	10
Personal, community and social services	0.622	0.471	1.093	14	0.698	0.325	1.022	7
Tourism	**0.883**	**0.644**	**1.527**	**8**	**0.724**	**0.701**	**1.425**	**6**

Source: Lao PDR I-O tables using SimSIP SAM software
Note: The strongest/highest value sector was ranked 1 and the least was 14.
WBL=Weighted backward linkage, WFL=Weighted forward linkage, WTL=Weighted total linkage

Table 5.9 shows the key sectors in 2003 based on the values of the weighted linkages of the economic sectors of the Lao PDR economy. The food and beverages manufacturing sector was a key sector whereas tourism registered as the most highly backward oriented sector in the economy followed by transport and communication, and electricity and water supply sector. These sectors, with a high backward linkages values in the economy, have a higher dependency on intermediate goods, which are typically capital intensive. In addition, the tourism sector showed relatively high indices of the power of dispersion indicating higher backward linkage effects that result in higher output multipliers.

Table 5.9 Key sectors of the Lao PDR based on weighted linkages in 2003.

Key sectors	Backward oriented sectors
Food and beverages manufacturing	**Tourism**
	Transport and communication
	Electricity and water supply
Forward oriented sectors	**Weak sectors**
Wholesale and retail trade	Forestry and logging
Agriculture and livestock	Banking, finance and insurance
Personal, social and community services	All other manufacturing
	Real estate and business services
	Public administration
	Mining and quarrying
	Construction

The wholesale and retail trade, agriculture and livestock, and the personal, social and community services sectors were forward oriented sectors in 2003. The remaining seven sectors were weak sectors in the Lao PDR economy (see Table 5.9). The low forward linkage value for the tourism sector, low indices of sensitivity, indicates that the output of the sector goes mainly either for private or final consumption and that the sector is service oriented.

Table 5.10 illustrates the key economic sectors of Lao PDR economy based on the weighted linkages value in 2008. The wholesale and retail trade sector was a key sector whereas the tourism sector again registered as the most highly backward oriented sector in the economy followed by the transport and communication, and the electricity and water supply sectors. Two more sectors, food and beverages manufacturing and the construction sector, were backward oriented sectors in 2008 in contrast to 2003. The sectors with forward orientation in 2008 were the agriculture and livestock; mining and quarrying; and banking and finance sectors. The remaining five sectors were weak sectors in the economy in 2008 (see Table 5.10).

Table 5.10 Key sectors of the Lao PDR based on weighted linkages in 2008.

Key sector	Backward oriented sectors
Wholesale and retail trade	**Tourism**
	Transport and communication
	Food and beverages manufacturing
	Construction
	Electricity and water supply
Forward oriented sectors	**Weak sectors**
Agriculture and livestock	Forestry and logging
Mining and quarrying	All other manufacturing
Banking, finance and insurance	Real estate and business services
	Public administration
	Personal, social and community services

5.2.4 Analysis of the pure linkages of Lao PDR economic sectors

The economic linkages analysis by the Chenery-Watanabe and Rasmussen-Hirschman approaches have become less appropriate tools for identifying core relations in economic systems (Sonis et al., 1995). Hence, the authors proposed linkage measures that examine the linkages in monetary terms, the pure linkages approach, which quantifies the pure impacts of the production of a sector on the overall economy excluding the demand for inputs by that sector itself and the feedback effect from and to that sector. The pure linkages approach classifies sectors in terms of importance in output value but also verifies how the production process occurs in the economy (Parré et al., 2002). The pure inter-industry linkages of the economic sectors were computed in the Lao PDR economy.

Table 5.11 shows the pure linkages of the economic sectors in the Lao PDR in 2003. In terms of pure linkages, the tourism sector ranked sixth in pure backward linkages, generating US$44m of linkage effects, and seventh in pure forward linkages, generating US$48m of linkage effects. The sector registered seventh position in pure total linkages generating a total of US$93m of linkage effects in the economy in 2003. The pure forward linkage in the tourism sector quantifies the pure impacts of the production of the rest of the economy excluding the tourism sector itself. Pure backward and forward linkages are added to quantify the pure total linkages of the economic sectors for both years (see Tables 5.11 and 5.12).

Table 5.11 Pure linkages of the Lao PDR economy in 2003 (million US$).

Sectors	PBL	Rank	Sectors	PFL	Rank	Sectors	PTL	Rank
Food and beverages manufacturing (FOODBEV)	851.69	1	AGRILIVE	670.79	1	FOODBEV	1001.0	1
Agriculture and livestock (AGRILIVE)	315.17	2	ALLMANU	225.65	2	AGRILIVE	986.0	2
Construction (CONSTRU)	88.56	3	WHRTRAD	216.10	3	ALLMANU	280.7	3
Personal, community and social services (PERSERVI)	57.39	4	FOODBEV	149.29	4	WHRTRAD	252.1	4
All other manufacturing (ALLMANU)	55.00	5	PERSERVI	72.46	5	PERSERVI	129.9	5
Tourism (TOURISM)	**44.88**	**6**	BANKFINA	50.62	6	CONSTRU	113.8	6
Mining and quarrying (MINEQYA)	41.43	7	**TOURISM**	**48.43**	**7**	**TOURISM**	**93.3**	**7**
Wholesale and retail trade (WHRTRAD)	36.02	8	FORESLOG	45.11	8	FORESLOG	72.1	8
Forestry and logging (FORESLOG)	26.97	9	TRANCOM	34.13	9	BANKFINA	64.6	9
Public administration (PUBADMI)	26.65	10	ELECWAT	31.10	10	TRANCOM	54.9	10
Electricity and water supply (ELECWAT)	22.80	11	CONSTRU	25.22	11	ELECWATE	53.9	11
Transportation and communication (TRANCOM)	20.75	12	PUBADMI	23.78	12	PUBADMIN	50.4	12
Banking and finance (BANKFINA)	13.95	13	REALBUSI	23.14	13	MINEQYAR	43.8	13
Real estate and business services (REALBUSI)	10.67	14	MINEQYA	2.35	14	REALBUSI	33.8	14
Total	**1,612**			**1,618**			**3,230**	

Note: The strongest/highest value sector was ranked 1 and the least as 14.
PBL = Pure Backward Linkages, PFL = Pure Forward Linkages, PTL = Pure Total Linkages

In 2003, the food and beverages manufacturing and agriculture and livestock sectors were the two biggest economic sectors of Lao PDR, generating the highest pure total linkages with the values of US$1,001m and US$986m, respectively. Overall, a total of US$1,612m was generated as pure backward linkage effects, US$1,618m as pure forward linkage effects and US$3,230m as pure total linkage effects in the economy in 2003. Pure linkages are used for a direct comparison of the relative importance of the economic production sectors with monetary values (Parra & Wodon, 2008). For example, in the case of the tourism sector, it indicates the total output driven by the tourism sector in other economic sectors as a pure linkage, which excludes the effect within the tourism sector.

Table 5.12 shows the pure linkages values of the economic sectors in the Lao PDR economy in 2008. The tourism sector ranked sixth, generating a total value of US$179m of pure backward linkage effects, and seventh a total value of US$158m of pure forward linkage effects in the country's economy. Total pure linkages of US$337m were generated by the tourism sector. In 2008, the food and beverages manufacturing sector yielded the highest pure backward linkages and agriculture and livestock yielded highest pure forward linkages. In terms of pure total linkages, agriculture and livestock, wholesale and retail trade, and the food and beverages manufacturing sectors ranked the three most important sectors generating pure total linkages in 2008.

While comparing the total gross tourism receipts and total pure linkage effects of the tourism sector in the country, the total pure linkage effect of the sector was US$93m (the total direct receipts of tourism were US$87m) in 2003, which increased to US$337m of total pure linkage effects (total direct receipts of tourism were US$275m) in 2008. A total value of US$2,656m was generated as the pure backward linkage effects, US$2,619m as the pure forward linkage effects, yielding US$5,275m as the pure total linkage effects in the economy in 2008.

Table 5.12 Pure linkages in the Lao PDR economy in 2008 (million US$).

Sectors	PBL	Rank	Sectors	PFL	Rank	Sectors	PTL	Rank
Food and beverages manufacturing (FOODBEV)	425.08	1	AGRILIVE	463.69	1	AGRILIVE	796.9	1
Agriculture and livestock (AGRILIVE)	333.2	2	WHRTRA	374.56	2	WHRTRA	657.1	2
Wholesale and retail trade (WHRTRAD)	282.5	3	BANKFIN	241.07	3	FOODBEV	623.2	3
Mining and quarrying (MINEQYA)	211.16	4	ALLMANU	209.87	4	ALLMANU	419.5	4
All other manufacturing (ALLMANU)	209.65	5	FOODBEV	198.07	5	MINEQYA	408.0	5
Tourism (TOURISM)	**179.11**	**6**	MINEQYA	196.82	6	**TOURISM**	337.8	**6**
Forestry and logging (FORESLO)	164.88	7	**TOURISM**	**158.67**	**7**	BANKFIN	333.6	7
Public administration (PUBADMI)	157.55	8	FORESLO	153.27	8	FORESLO	318.2	8
Construction (CONSTRU)	141.86	9	CONSTRU	148.34	9	CONSTRU	290.2	9
Electricity and water supply (ELECWAT)	139.85	10	ELECWAT	134.57	10	ELECWAT	274.4	10
Transport and communication (TRANCOM)	131.63	11	TRANCOM	117.76	11	TRANCOM	249.4	11
Personal, community and social services (PERSERV)	94.73	12	PERSERV	83.09	12	PUBADMI	226.4	12
Banking and finance (BANKFIN)	92.52	13	REALBUS	70.81	13	PERSERV	177.8	13
Real estate and business services (REALBUS)	92.39	14	PUBADMI	68.85	14	REALBUS	163.2	14
Total	**2,656**			**2,619**			**5,275**	

Note: The strongest/highest value sector was ranked 1 and the least as 14.
PBL = Pure Backward Linkages, PFL = Pure Forward Linkages, PTL = Pure Total Linkages

Table 5.13 shows the key sectors of the Lao PDR economy for both years of the study based on pure linkages. The economic sectors were defined as key, average and weak sectors according to their linkage strengths in generating pure linkage effects in the country's economy. The food and beverages manufacturing, agriculture and livestock, other manufacturing, wholesale and retail trade, and personal, community and social services sectors were identified as key sectors in 2003. In 2008, the agriculture and livestock; wholesale and retail trade, food and beverages manufacturing, other manufacturing, and mining and quarrying sectors registered as key sectors (see Table 5.13).

Table 5.13 Key sectors of the Lao PDR economy based on pure linkages in 2003 and 2008.

Sectors	2003	2008
Key	Food and beverages manufacturing	Agriculture and livestock
	Agriculture and livestock	Wholesale and retail trade
	All other manufacturing	Food and beverages manufacturing
	Wholesale and retail trade	All other manufacturing
	Personal, community and social services	Mining and quarrying
Average	Construction	**Tourism**
	Tourism	Banking, finance and insurance
	Forestry and logging	Forestry and logging
	Banking, finance and insurance	Construction
	Transport and communication	Electricity and water supply
Weak	Electricity and water supply	Transport and communication
	Public administration	Public administration
	Mining and quarrying	Personal, community and social services
	Real estate and business services	Real estate and business services

In terms of pure linkages, tourism was at the top among the five sectors showing average performance in the country's economy in 2003 along with construction, forestry and logging, banking and finance, and transport and communication. Similarly, the tourism; banking and finance, forestry and logging, construction, and electricity and water supply sectors were average performing sectors in 2008 based on their performance in generating pure linkage effects in the economy. The sectors possessing weak pure backward and forward linkages were electricity and water supply, public administration, mining and quarrying, and real estate and business services in 2003 and transport and communication, public administration, personal, community and social services, and real estate and business services in 2008. These

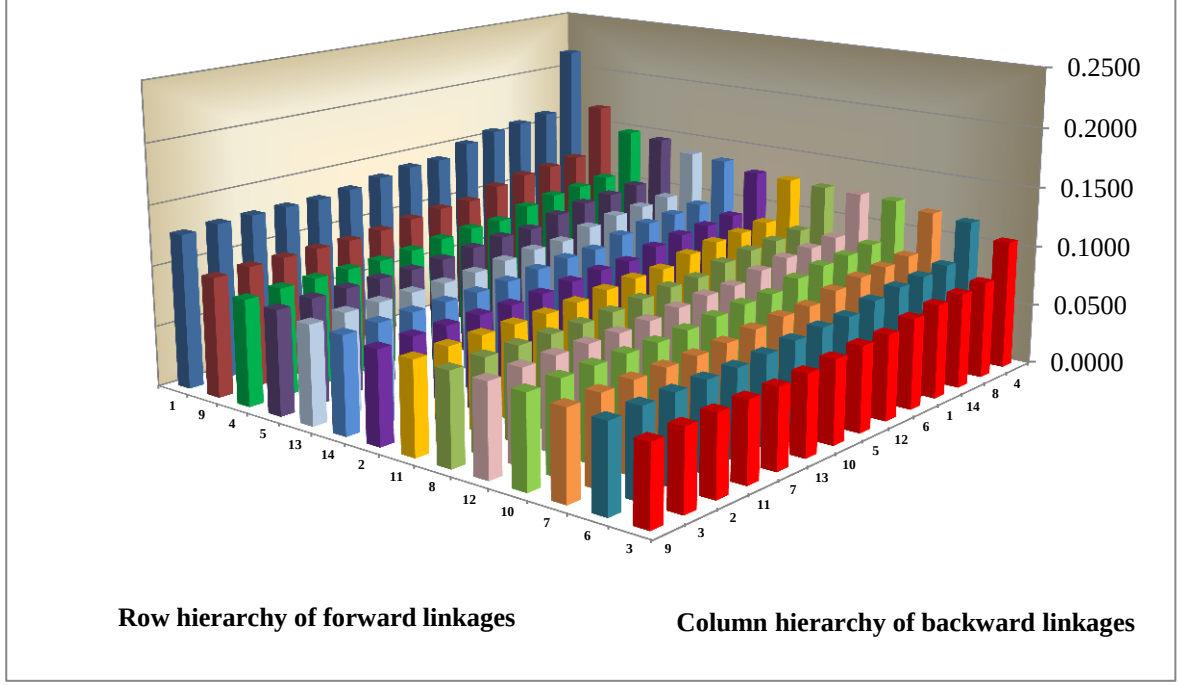
sectors generated the least total pure linkage effects and do not appear significant in the pure linkage measures in the economy.

5.2.5 The economic landscape of the Lao PDR economy

One of the sub-products of Leontief inverse matrix is the I-O MPM, which shows graphically the economic sectors imposing the backward and forward linkage hierarchies (Sonis et al., 1995). Figure 5.3 shows the economic landscape of the Lao PDR in 2003, which is also called the hierarchies of backward and forward linkages of the economy. The figure shows the economic sectors' ranking based on the size of their hierarchies of the backward and forward linkages. In I-O MPM, the row represents the hierarchy of forward linkages while the column provides the details of the backward linkages. For example, the figure shows that the sectors in the first column of the table are those with higher backward linkages in the economy whereas the sectors in the first row of the table have greater forward linkages and vice versa. Each cell of the I-O table denotes its first order change in the sum of all elements of the inverse matrix cause by the change in the I-O coefficients (Parra & Wodon, 2008).

The results reveal that the tourism sector ranked third in the greater hierarchy of the backward linkages of the economy in 2003. The two sectors ranked before tourism are food and beverages manufacturing (ranked first) and transport and communication (ranked second) in the greater hierarchy of the backward linkages (see Figure 5.3). The sectors which achieved the average hierarchy in backward linkages in 2003 were electricity and water supply (ranked fifth), pubic administration (ranked sixth), other manufacturing (ranked seventh), and banking and finance (ranked eighth). The remaining six sectors were considered as lowly performed sectors below the average hierarchies of all sectors in the economy in 2003.

In terms of greater hierarchy of forward linkages, the agriculture and livestock (ranked first), wholesale and retail trade (ranked second), and food and beverages manufacturing (ranked third) in the economy in 2003 (see Figure 5.3). The tourism sector registered as an average performing sector based on the greater hierarchy of forward linkages, which ranked sixth after other manufacturing (ranked fourth), personal, community and social services (ranked fifth). The construction sector ranked seventh and forestry and logging ranked eighth. The remaining sectors were considered lowly performed sectors in 2003 based on the hierarchy of forward linkages.



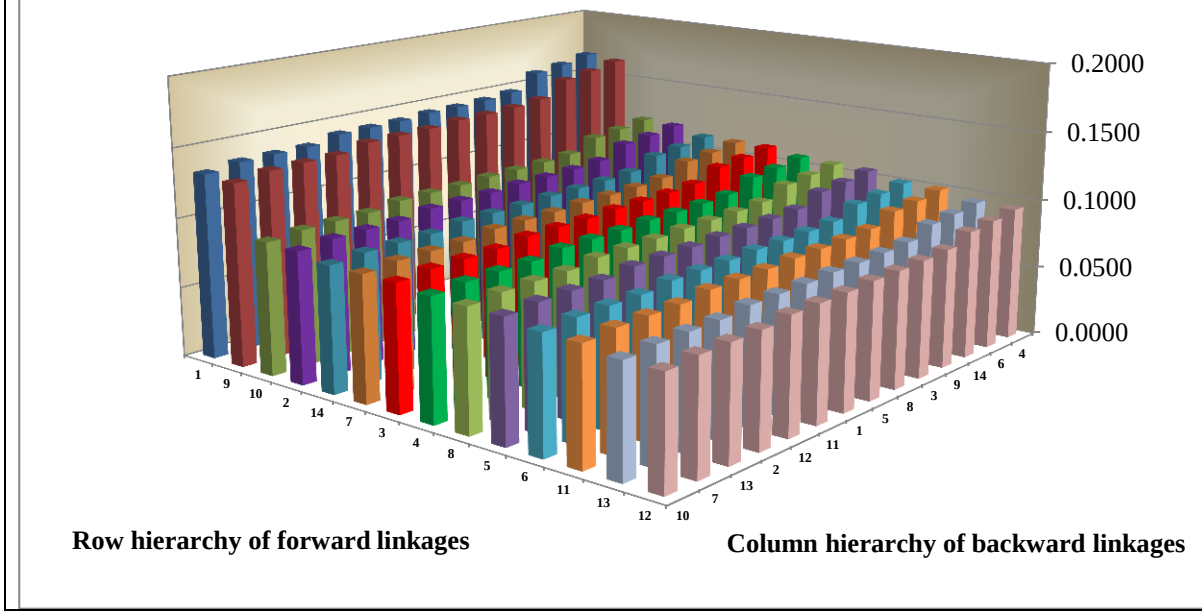
Legend

Sector No.	Economic sector description
1	Agriculture and livestock
2	Forestry and logging
3	Mining and quarrying
4	Food and beverage manufacturing
5	All other manufacturing
6	Electricity and water supply
7	Construction
8	Transport and communication
9	Wholesale and retail trade
10	Banking and finance
11	Real estate and business services
12	Public administration
13	Personal, community and social services
14	Tourism

Figure 5.3 Economic landscapes of the Lao PDR economy in 2003.

Figure 5.4 shows the structure of the economic landscape of the Lao PDR economy in 2008. In terms of the backward linkages, the tourism sector, along with food and beverages manufacturing, electricity and water supply, and wholesale and retail trade, were the four most important sectors in the hierarchy of backward linkages in 2008. These economic sectors achieved higher hierarchies than the average of all sectors' hierarchies in the country.

The sectors possessing average backward linkage hierarchies in the economy in 2008 were: mining and quarrying, transport and communication, other manufacturing, agriculture and livestock, and real estate and business services (see Figure 5.4). The remaining sectors were considered as the least important sectors in the country based on the hierarchy of backward linkages in 2008. Agriculture and livestock, wholesale and retail trade, banking and finance, forestry and logging, and tourism achieved greater hierarchy of forward linkages in economy in 2008. The sectors exhibiting average hierarchies in the economy were construction; mining and quarrying; food and beverages; and transport and communication. The remaining sectors were considered as weak sectors in 2008 in the economy. Appendices 13 and 14 give the values of the I-O MPM in 2003 and 2008, respectively, for the country's economy.



Legend

Sector No.	Economic sector description
1	Agriculture and livestock
2	Forestry and logging
3	Mining and quarrying
4	Food and beverage manufacturing
5	All other manufacturing
6	Electricity and water supply
7	Construction
8	Transport and communication
9	Wholesale and retail trade
10	Banking and finance
11	Real estate and business services
12	Public administration
13	Personal, community and social services
14	Tourism

Figure 5.4 Economic landscape of the Lao PDR economy in 2008.

5.3 Analysis of Self Sufficiency Rate of the Lao PDR economic sectors

Table 5.14 shows the Self Sufficiency Rate (SSR) values for the 14 economic sectors of the Lao PDR economy for 2003 and 2008. In 2003, mining and quarrying (SSR=2.23) and forestry and logging (SSR=1.10) were the only two sectors that qualified as self sufficient to meet the domestic demand in the country. However, in 2008, the electricity and water supply (SSR=1.54), mining and quarrying (SSR=2.50) and forestry and logging (SSR=1.08) sectors were the three self sufficient sectors in the economy. The tourism sector ranked 11th in regards to SSR in both years and the sector's SSR value decreased from 0.77 (2003) to 0.64 (2008) during the study period. The results demonstrated that the tourism sector was about 77 percent self reliant in 2003 but this decreased to 64 percent in 2008 (see Table 5.14). The lower SSR values of the tourism sector revealed that the sector was significantly dependent on imports for tourism goods and services, and income leakages through the Lao PDR economy. Agriculture and livestock (SSR=0.88) and real estate and business services (SSR=0.85) were the two higher ranked sectors in the economy in 2008.

Table 5.14 Self sufficiency rates of the economic sectors of the Lao PDR.

Economic sectors	2003	Rank	2008	Rank
Agriculture and livestock	0.91	6	0.88	4
Forestry and logging	1.10	2	1.08	3
Agriculture sector average	**1.01**		**0.99**	
Mining and quarrying	2.23	1	2.50	1
Food and beverages manufacturing	0.98	3	0.79	7
All other manufacturing	0.75	12	0.82	6
Electricity and water supply	0.90	8	1.54	2
Construction	0.65	13	0.57	13
Industry sector average	**1.10**		**1.24**	
Transport and communication	0.91	7	0.55	14
Wholesale and retail trade	0.86	9	0.72	10
Banking, finance and insurance	0.93	5	0.63	12
Real estate and business services	0.98	4	0.85	5
Public administration	0.82	10	0.79	8
Personal, social and community services	0.64	14	0.73	9
Tourism	**0.77**	**11**	**0.64**	**11**
Service sector average	**0.84**		**0.70**	
All sectors average	**0.89**		**0.85**	

Note: The strongest/highest value sector is ranked 1 and the least as 14.

The sectors obtaining SSR values close to one are considered self sufficient in domestic production to meet the country's demands. These included real estate and business services (SSR=0.98) and food and beverages manufacturing (SSR=0.98), which were close to achieving self sufficiency in 2003. These sectors were ranked as the third and fourth highest

ranked sectors, respectively, among the 14 economic sectors in the economy. Meanwhile, the banking and finance (SSR=0.63), construction (SSR=0.57) and transport and communication (SSR=0.55) were lowest performing sectors in terms of self sufficiency in 2008. These sectors depended heavily on imports for goods and services, a high level of foreign ownership and/or the majority of their income leaked from the economy. Asra et al. (2006) defined SSR for the economic sectors as the ratio of total production to total domestic demand. An economic sector with SSR $\geq$ 1 means that its output is sufficient to sustain its domestic demand. If the SSR < 1, then the economic sector is an import oriented sector that relies on the import of goods and services to meet the country's total domestic demand (Asra et al., 2006).

Considering the three economic sector groups (Agriculture, Industry and Service, see Table 5.14), the agriculture group was self sufficient for both years (average SSR=1.01 in 2003 and 0.99 in 2008). This was because the forestry and logging sector had a higher SSR in the two years (SSR=1.10 in 2003 and 1.08 in 2008). The industry group's average SSR increased from 1.10 in 2003 to 1.24 in 2008. This was because the mining and quarrying sector was regarded as the biggest and most important sector in the country, exhibiting the highest SSR values in the study period. The electricity and water supply sector was the most improved sector in terms of self sufficiency with a SSR of 0.90 in 2003 rising to 1.54 by 2008. However, the average value of SSR of the Service sector was significantly lower than the Industry and Agriculture sectors with a SSR of 0.84 in 2003, which decreased to 0.70 in 2008. The weighted SSR values of all sectors were 0.89 and 0.85 in 2003 and 2008, respectively. The country overall SSR value seems to have decreased slightly from 0.89 to 0.85 between the two years considered. This reflects the fact that the Lao PDR economy was 89 percent self sufficient in 2003 but this reduced to 85 percent in 2008. This is because the growth of imports was higher than the growth of intermediate activities and the exports of the country.

The most notable Industry sectors with exceedingly low SSR values in 2008 were construction (0.57) and other manufacturing (0.82) (see Table 5.14). This result is attributed to the significantly low SSR of 0.55 posted by the service sector transport and communication and 0.88 by the agriculture and livestock sector. In 2008, the electricity and water supply, and mining and quarrying sectors registered the highest SSR values (1.54 and 2.50, respectively) because the bulk of their output was exported. Production in the agriculture sector is seen as self sufficient to meet domestic demand but less than self sufficient to satisfy the domestic demand for the service sectors. The forestry and logging and mining and quarrying sectors both have relatively low linkages although their production is high and they were considered

as self sufficient in 2003 and 2008. These sectors are the least users of intermediate inputs from the economy while a substantial amount of their production is exported.

5.4 Key sector identification using Multi Rank Index of the Lao PDR economy

The key sectors were identified based on multiple criteria such as the four multiplier indicators (output multiplier, employment multiplier, normal multiplier and ratio multiplier) and six inter-industry linkage indicators (total inter-industry linkages, total backward and forward linkages, pure total linkages, weighted total linkages, multiplier product matrix and self-sufficiency rate analysis). A new value was assigned to economic multipliers and inter-industry linkage analyses indicators such as output multipliers, normal multipliers, ratio multipliers and employment index (see Chapter 4) and total inter-industry linkage, total linkage, pure linkage, weighted linkage, I-O MPM and SSR values (results presented in this chapter) of all 14 economic sectors based on their rankings. The new values were assigned as follows: the sectors ranked 1-5 were assigned a score of three, the sectors ranked 6-10 a score of two and the sectors ranked 11-14 a score of one, in their respective new rankings. After summing and averaging these values for all 14 economic sectors, the sectors that achieved the highest total and average scores were identified as the key sectors (first five sectors), followed by the average sectors (next five sectors) and weak sectors (last four sectors).

Table 5.15 shows the overall ranking of the economic sectors using the MRI approach in 2003 in the Lao PDR economy. Based on the total and average scores, food and beverages manufacturing (an average score of 3.0), agriculture and livestock (an average score of 2.9), tourism (an average score of 2.5), transport and communication (an average score of 2.3), and wholesale and retail trade (an average score of 2.2) were the top five ranked sectors in the economy in 2003. The other manufacturing, construction, banking and finance, and forestry and logging sectors ranked as sixth, seventh, eighth and ninth most important sectors in the economy, respectively (see Table 5.15). The remaining economic sectors achieved the lowest values and were considered weak sectors in the economy in 2003.

Table 5.15 Ranking of the economic sectors of the Lao PDR economy scores in 2003 using the Multi Rank Index.

Economic sectors	OM	Jobs	NM	RM	TIL	TBFL	PTL	WTL	MPM	SSR	Average	OR
Agriculture and livestock	3	3	3	3	3	3	3	3	3	2	2.900	2
Forestry and logging	1	3	1	1	1	2	2	3	2	3	1.900	9
Mining and quarrying	1	1	1	1	1	2	1	2	1	3	1.400	14
Food and beverages manufacturing	3	3	3	3	3	3	3	3	3	3	3.000	1
All other manufacturing	2	2	2	2	2	2	3	3	3	1	2.200	6
Electricity and water supply	3	1	3	2	3	3	1	1	1	2	2.000	7
Construction	1	3	2	1	2	1	2	2	1	1	1.600	12
Transport and communication	3	2	3	3	3	2	2	1	2	2	2.300	4
Wholesale and retail trade	1	2	1	3	1	3	3	3	3	2	2.200	5
Banking and finance	2	1	2	2	2	2	2	2	1	3	1.900	8
Real estate and business services	2	2	1	1	1	1	1	1	2	3	1.500	13
Public administration	2	2	2	2	2	1	1	2	2	2	1.800	10
Personal, community and social services	2	1	2	2	2	1	3	1	3	1	1.800	11
Tourism	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**1**	2.500	**3**

Note: The strongest/highest value sector is ranked 1 and the least as 14.
OM = Output multiplier, NM = Normal multiplier, RM = Ratio multiplier (Type I), TIL= Total inter-industry linkages, TBFL = Total backward and forward linkage
PTL = Pure total linkage, WTL = Weighted total linkage, MPM= Multiplier product matrix, SSR = Self sufficiency rate, OR = Overall rank

Table 5.16 shows the overall ranking of the economic sectors in 2008 using the MRI approach in the Lao PDR economy. The tourism sector ranked third in 2003 (an average value of 2.5 out of 3.0) and fourth in 2008 (an average score of 2.6 out of 3.0) (see Tables 5.15 and 5.16). However, in 2008, the tourism sector achieved higher values in both average and total scores using the MRI approach than in 2003, which indicates that the sector is becoming more important in the economy. Food and beverages manufacturing (an average score of 2.8), agriculture and livestock (an average score of 2.7), wholesale and retail trade (an average score of 2.7), tourism (an average score of 2.6), and mining and quarrying (an average score of 2.3) were the top five ranked sectors in 2008. The electricity and water supply, other manufacturing, forestry and logging, transport and communication, and construction sectors were the sixth, seventh, eighth and ninth most important sectors in the country's economy, respectively. The remaining four sectors were weak sectors.

Table 5.16 Ranking of the economic sectors of the Lao PDR economy scores in 2008 using Multi Rank Index.

Economic sectors	OM	Jobs	NM	RM	TIL	TBFL	PTL	WTL	MPM	SSR	Average	OR
Agriculture and livestock	2	3	2	3	2	3	3	3	3	3	2.700	2
Forestry and logging	1	3	1	3	1	1	2	2	3	3	2.000	8
Mining and quarrying	3	1	2	2	3	2	3	2	2	3	2.300	5
Food and beverages manufacturing	3	3	3	3	3	3	3	3	2	2	2.800	1
All other manufacturing	2	2	3	1	2	2	3	3	2	2	2.200	6
Electricity and water supply	3	1	3	2	3	2	2	1	1	3	2.100	7
Construction	1	2	1	2	1	2	2	3	2	1	1.700	10
Transport and communication	2	3	2	2	2	3	1	1	2	1	1.900	9
Wholesale and retail trade	3	1	3	3	3	3	3	3	3	2	2.700	3
Banking and finance	1	1	1	2	1	2	2	1	3	1	1.500	13
Real estate and business services	2	2	2	1	2	1	1	1	1	3	1.600	11
Public administration	2	2	2	1	2	1	1	2	1	2	1.600	12
Personal, community and social services	1	2	1	1	1	1	1	2	1	2	1.300	14
Tourism	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**	**1**	2.600	**4**

Note: The strongest/highest value sector is ranked 1 and the least as 14.
OM = Output multiplier, NM = Normal multiplier, RM = Ratio multiplier (Type I), TIL= Total inter-industry linkages, TBFL = Total backward and forward linkage
PTL = Pure total linkage, WTL = Weighted total linkage, MPM= Multiplier product matrix, SSR = Self sufficiency rate, OR = Overall rank

Table 5.17 shows the key sectors of Lao PDR economy for 2003 and 2008 based on the MRI approach. In 2003, the tourism sector, together with food and beverages manufacturing, transport and communication, agriculture and livestock, and the wholesale and retail trade sectors were identified as the key sectors. Similarly, the food and beverages manufacturing, agriculture and livestock, wholesale and retail trade, tourism, and mining and quarrying sectors obtained key sector status in 2008. The results showed that an increase in the final demand for these sectors' output will have a greater impact on the sectors that supply inputs in the production of these sectors' output in the country's economy.

Table 5.17 Key sectors of Lao PDR economy in 2003 and 2008 based on the Multi Ranked Index approach.

Sectors	2003	2008
Key	Food and beverages manufacturing	Food and beverages manufacturing
	Agriculture and livestock	Agriculture and livestock
	Tourism	Wholesale and retail trade
	Transport and communication	**Tourism**
	Wholesale and retail trade	Mining and quarrying
Average	All other manufacturing	Electricity and water supply
	Electricity and water supply	All other manufacturing
	Banking, finance and insurance	Forestry and logging
	Forestry and logging	Transport and communication
	Public administration	Construction
Weak	Personal, community and social services	Real estate and business services
	Construction	Public administration
	Real estate and business services	Banking, finance and insurance
	Mining and quarrying	Personal, community and social services

Other manufacturing, electricity and water supply, banking and finance, forestry and logging, and public administration were average performing sectors in 2003 (see Table 5.17). In 2008, the electricity and water supply, other manufacturing, forestry and logging, transport and communication, and construction were average sectors in the economy. These sectors' final demand increments will have moderate impacts on the economic sectors that supply the inputs in the production of these sectors' output in the country. The sectors exhibiting weak linkages and interdependency fell into the category of weak sectors at the bottom of the rankings. For 2003, these include personal, community and social services, construction, real estate and business services, and mining and quarrying and in 2008 they include real estate and business services, public administration, banking and finance, and personal, community and social

services. These sectors' final demand increments will have significantly lower impacts on the sectors that supply inputs in the production of these sectors' output in the country. Additionally, these sectors were characterized by high imports of goods and services, a high level of income leakages and feature a high level of foreign ownership or a lower level of intermediate activities and sales as a proportion of their gross outputs in the country.

Table 5.18 summarizes of the values of the different inter-industry linkage approaches used in this study. The tourism sector achieved higher total inter-industry linkage values in 2008 than in 2003 using Chenery-Watanabe approach. In the Rasmussen-Hirschman approach, the tourism sector was one of the strongest backward oriented sectors. Similarly, the tourism sector ranked eighth in 2003 and sixth in 2008 when considering the weighted linkages in the country's economy. In terms of pure linkages, the tourism sector was seventh, generating a total value of US$93m of total linkage effects in 2003; the sector generated a total pure linkage value of US$337m in 2008, ranked sixth among the 14 economic sectors. In the SSR analysis, the sector ranked 11th for both years indicating the significant level of the import of tourism goods and services to the country. Therefore, the tourism sector's dependency on imports increased and the value of SSR decreased from 0.77 in 2003 to 0.64 in 2008 (see Table 5.18). The MRI approach showed that the tourism sector ranked third and fourth in 2003 and 2008, respectively, and the sector achieved key sector status for both years.

The Chenery Watanabe approach is based on intermediate output/input and provides strong first round effects and disregards the subsequent round of effects. The Rasmussen Hirschman Index is based on total output rather than intermediate output and provides each round of the backward and forward linkages effects. Similarly, pure linkages provide us the linkage with other economic sector excluding the linkage effect created by that sector within the sector in monetary terms (Parra and Wodon, 2008). While calculating the weighted linkages the total production outputs are considered as weights for the linkage effects (Parra and Wodon, 2008). The I-O MPM shows the hierarchies of economic sectors based on their linkage strengthen for both purchase and sale in the economy. Self-sufficiency rate analysis provides the ratio of total production to total domestic demand (Asra et al., 2006). Therefore, these inter-industry linkage approaches do not replace but complement each other and derive different ways of explaining and interpreting. Additionally, the different values of these linkages are mainly due to the different methodological procedures.

Table 5.18 Summary of the inter-industry linkages of Lao PDR tourism sector using different approaches.

Approaches to linkage measurement	2003						2008					
	BL	Rank	FL	Rank	TL	Rank	BL	Rank	FL	Rank	TL	Rank
Chenery-Watanabe	1.41	3	1.27	6	2.69	4	1.54	3	1.37	5	2.92	4
Rasmussen-Hirschman	1.09	3	0.97	5	2.06	4	1.24	1	0.97	5	2.21	3
Weighted linkages	0.88	6	0.64	11	1.52	8	0.72	4	0.70	5	1.42	6
Pure linkages*	44.8	6	48.4	7	93.3	7	179.1	6	158.6	7	337.8	6
I-O Multiplier Product Matrix	-	3	-	6	-	-	-	3	-	6	-	-
Self sufficient rate	-	-	-	-	0.77	11	-	-	-	-	0.64	11
Overall (Multi Rank Index)	-	-	-	-	-	3	-	-	-	-	-	4

Source: Own calculations

Note: The strongest/highest value obtained sector ranked 1 and the least as 14.

*Pure linkage values are on currency terms in million US$.

BL = Backward linkage

FL = Forward linkage

TL = Total linkage

Midmore et al. (2006) reported that actual inter-industry linkages are overstated, which shows strong first round effects in the Rasmussen-Hirschman approach because each round of the backward or forward multiplier encapsulated in the Leontief inverse uses the total output, rather than the intermediate output, of the selling sector. These authors further reported that the inclusion of primary input in the calculation of multipliers overstates the magnitude of linkages and distorts the estimates of the actual hierarchy of sector dynamism.

Kula (2008) found 12 key common sectors out of the 56 sectors considered in both Chenery-Watanabe and Rasmussen-Hirschman linkage approaches for Turkey. They include food and beverages, agriculture, wholesale and retail trade and tour agency sectors. Andreosso-O'callaghan and Yue (2004), in China, recommended the pure linkage method over the total linkage method for better results in identifying key sectors. The study also identified relatively different key sectors using the Chenery-Watanabe, Rasmussen-Hirschman, weighted, pure, and I-O MPM linkage approaches. Similarly, Sonis et al. (1995) used the Rasmussen-Hirschman and I-O MPM methods to explore the inter-industry linkages. Kweka et al. (2001, 2003) used several linkage analysis approaches and the MRI approach to identify key sectors. Beynon, Jones and Munday (2009) also used Rasmussen-Hirschman, Chenery-Watanabe and Eigenvector approaches for the inter-industry linkage analysis.

Using different inter-industry linkage approaches, our study identified slightly different key sectors in the Lao PDR economy. Similar results were reported by Parre et al. (2002) for Brazil where the authors found 11 key sectors (using backward linkages) and nine sectors as key sectors (using forward linkages) out of 22 sectors. In our study, the common key sectors include the wholesale and retail trade, agriculture and livestock, food and beverages manufacturing, and tourism sectors. Three of the five key sectors in 2008 are in the services sector (tourism, wholesale and retail trade, and electricity and water supply) but there were only two key sectors in 2003 (tourism and wholesale and retail trade) of the economy. The results showed that the structure of the economy indicated that the key sector interactions had shifted from the agriculture and industry sectors to the service sectors providing evidence supporting the fact that the services sectors' dominated in the Lao PDR economy during 2003-2008. It is reasonable to expect that structural coefficients change slowly in developing countries leaning towards the services oriented sectors (Kweka et al., 2003; Leontief, 1986).

While identifying key sectors in the economy, Kweka et al. (2003) considered only two categories, key and weak sectors. The economic sectors that scores more than average are key sectors and less than average are weak sectors based on the frequencies of different

multipliers and linkages analysis in the key sectors. In our study, we created buffer zone of 'average performing sectors' which is between key and weak sectors. Therefore, the ranking might have given slightly better explanation as compared to previous ranking method applied by Kweka et al. (2003).

The different results of these inter-industry linkage approaches are mainly due to the different methodological procedures. Therefore, the different inter-industry linkage methods used in our study do not replace each other for the key sector analyses of the economy but they complement each other to derive different ways of explaining and interpreting. Therefore, the multiple indicators of the linkages and multipliers used in our study have exhibited desired and consistent outcomes. This study's findings also support the findings of the Sonis et al. (1995), Andreosso-O'Callaghan and Yue (2004); Cai and Leung (2004), Kweka et al. (2001, 2003); and Kula (2008) in identifying the key sectors in the economy.

5.5 Chapter summary

This chapter discussed the results from the 2003 and 2008 Lao PDR I-O models of the interdependency and inter-industry linkage of the tourism sector with the different economic sectors. The results revealed that the average backward and forward linkages of the tourism sector compared with the other economic sectors increased from 2003 to 2008. Using the Chenery-Watanabe linkage approach, the results showed that tourism's interaction with the other economic sectors increased by 23 cents per dollar spent indicating the higher dependency of the tourism on the intermediate inputs over a period of five years. The tourism sector ranked third most important and influential sector for both years indicating stronger linkages among the 14 economic sectors in Rasmussen-Hirschman approach.

Tourism is a key sector in the Lao PDR economy in 2008 because of the following findings:

- Tourism output, employment, value added multipliers were higher than most of the other sectors as the sector ranked third among the 14 economic sectors.
- The sector contributed 13 percent to the country's total employment which is one of the highest in the country. This implies that one in every 7 people relies on tourism for their major employment.
- Tourism contributed 7.5 percent to the national GDP which is fourth largest among the 14 economic sectors.
- Tourism generated 8.4 percent revenue to the total tax revenue in the country.
- Tourism is ranked second in the foreign currency earners in the country after mining and quarrying sector since 2001.

- Tourism sector has one of the highest backward linkages values sectors in the economy.
- Tourism also featured one of the four key sectors for both years of the study.
- Using multiple criteria and MRI approach, the tourism sector ranked third (2003) and fourth (2008) important sector in the economy.

In 2008, tourism, along with food and beverages manufacturing, agriculture and livestock, wholesale and retail trade, and mining and quarrying, achieved key sector status in the country. The tourism sector ranked eighth in 2003 and sixth in 2008 in terms of the weighted linkages. The sector occupied seventh position in pure total linkages in 2003 and sixth in 2008, among the 14 economic sectors. In terms of SSR, the tourism sector ranked 11th for both years, indicating the significant level of imports of tourism goods and services in the country. The I-O MPM approach revealed that the sector achieved higher hierarchies than the average of all sectors' hierarchies in 2008.

Using the MRI approach, the tourism sector ranked as the third and fourth key sector in 2003 and 2008, respectively. The results showed that tourism is one of the top four most important sectors and the sector has one of the highest backward linkages values in all inter-industry linkages measures used in this study. As reported by Pratt and Kay (2006), backward linked sectors are more important than forward linked sectors because backward linked sectors influence the rest of the economy through the multiplier effects. Forward linked sectors are those sectors that are most influenced by the backward linkages (Cai & Leung, 2004; Pratt & Kay, 2006). The backward oriented sectors are relatively more stable than the forward linked sectors (Bonet, 2005). Overall, based on the results of the linkage and key sector analyses, the tourism sector demonstrates its significant importance in the Lao PDR economy.

Chapter 6
Stakeholders' Perceptions and Visitors' Preferences on Lao PDR Tourism: Results and Discussion

This chapter discusses the results of the tourism stakeholders' interviews and international visitors' preferences on the management and impacts of tourism in the Lao PDR economy. Section 6.1 presents the results of the tourism stakeholders' perceptions of the socio-economic impact of tourism on the country's economy. This is followed by the tourism stakeholders' perceptions of the regional and national tourism marketing and promotion activities implemented in the country. Section 6.3 discusses the results of the stakeholders' and international visitors' perceptions of tourism growth and management in the country. The problems and obstacles facing the tourism sector in the country are presented in the next section. Section 6.5 summarizes the chapter.

6.1 Stakeholders' perceptions on the socio-economic impacts on Lao PDR tourism

6.1.1 Economic corridors' impacts on tourism

The tourism stakeholders' interview results showed that 82 percent of the stakeholders agreed that the economic corridors have benefited the tourism sector in the country, nine percent of stakeholders said tourism will get benefits in the future but have not received them yet and the remaining nine percent disagreed with the statement. Following the development of the economic corridors and implementation of the GMS Cross Border Transport Agreement, tourism became an important sector in the Lao PDR attracting a significant number of international visitors. Feeder roads' development, and infrastructure improvements such as tourist sites development and airport upgrades, helped Lao PDR tourism to grow significantly.

Table 6.1 shows the stakeholders' perceptions of the economic corridors' contribution to Lao PDR tourism. Eighty six percent of the interviewed stakeholders reported that the economic corridors have provided easy access for international visitors and 59 percent believed that the economic corridors have reduced travel and transportation time for the visitors. Similarly, 46 percent of the stakeholders reported that visitors are curious to experience untouched tourist sites by land routes and 41 percent believed that more businesses, such as hotels, restaurants, shopping centres and tour operators, are setting up along the economic corridors. Overall, the tourism stakeholders' interview results revealed that the economic corridors have enhanced the visitors' accessibility to the Lao PDR.

Table 6.1 Stakeholders' perceptions of the benefits of the economic corridors to Lao PDR tourism.

Benefits of economic corridors to Lao PDR tourism	Percentage agreement (n=22)
Easy access to visitors by economic corridors	86
Reduced travel and transportation time	59
Visitors are curious to know untouched sites by land route	46
More businesses are setting up along the corridors like hotels, transportation and tour operators	41
Increased domestic and international investments in the tourism sector	27
Development on educational and socio cultural aspects of residents along the corridors	23

Source: Tourism stakeholders' interview, 2009

Easy access is directly related to tourism growth because such accessibility facilitates the transportation of tourism goods and the movement of visitors within the country. The interviewed stakeholders reported that, after the opening of the economic corridors, a lot of tourism products and visitors moved across the GMS countries including caravans going into Thailand, Lao PDR, China and Vietnam along the economic corridors. One of the senior managers of the LNTA commented on the benefit of the economic corridors as follows:

> *"Visitors used to stay overnight in Lao PDR because of poor road conditions in the country. However, following the economic corridors development, visitors pass by Lao PDR either to Vietnam or Thailand and minimum economic activities are taking place from visitors in Lao PDR. Maybe in future the corridors will benefit Lao PDR tourism if the country develops more tourist destinations along the corridors to engage the visitors. Currently, majority of Thai, Chinese and Vietnamese visitors use their own vehicles to cross Lao PDR so the Lao transporters do not benefit significantly either."*

6.1.2 Socio-economic impacts of tourism in Lao PDR

Table 6.2 shows the interviewed stakeholders' perceptions of the tourism impacts on society, communities and the economy of the Lao PDR. Ninety one percent of the interviewed stakeholders believed that tourism is an economic gain to society and rural communities and 36 percent regarded it as an opportunity to build capacity in the tourism sector. A significant number of the interviewed stakeholders (77%) perceived that tourism benefits included creating employment for people and 55 percent said that tourism had empowered women and ethnic minorities in the country (see Table 6.2). The results also showed a significant number of visitors from Thailand, China and Vietnam who used their own transport, spent a few days

in the Lao PDR and refuelled the vehicle in their own country, which results in relatively less expenditure from the visitors in Lao PDR.

Table 6.2 Stakeholders' perceptions of tourism benefits to society, community and economy of the Lao PDR.

Benefits of tourism to society, community and the economy	Percentage agreement (n=22)
Economic gain to society/local people	91
Employment generation	77
Empowerment of women and ethnic minorities	55
Incentives to preserve environment and cultural assets whose value is hard to estimate	50
Has transversal impacts in different economic sectors	50
English language proficiency and exposure to outside world	50
Opportunity for capacity building	36
Lao PDR exports have risen	18

Source: Tourism stakeholders' interview, 2009

The interviewed stakeholders said that the Lao PDR tourism sector has provided a number of benefits to the society and community. For example, handicraft and souvenir products produced by local people are bought and consumed by international visitors. The interviewed stakeholders indicated that local and ethnic minorities are empowered and have started to manage community-based tourist destinations throughout the country. Further, in the Lao PDR, tourism is an opportunity for people residing in rural areas to develop themselves and to have access and exposure to the outside world.

6.1.3 Types of businesses developing along the economic corridors

Table 6.3 shows the interviewed stakeholders' perceptions of the types of tourism businesses developed along the economic corridors in the Lao PDR. The results revealed that 96 percent of the stakeholders indicated that the accommodation sector benefitted most from the development of the economic corridors compared with 64 percent for the local handicrafts industry (wood carving, weaving and souvenirs-producing sectors) followed by 55 percent for the transport sector. In addition, 50 percent of the stakeholders believed that tourism-related small and medium scale businesses also benefitted from the economic corridors.

The types of small and medium scale businesses along the economic corridors in Lao PDR include guesthouses, tour operators, restaurants and service stations. There are foreign investors investing in big hotels in the country. For example, there is a casino and five-star hotel called Savan Vegas, owned by Thai investors, along the EWEC in Savanakhet, which receives 5,000 visitors every week and employs around 500 local people. Similarly, along the

NSEC in Boten, Chinese investors have established a border trade zone including a casino, recreation centre and hotels. The interviewed stakeholders reported that visitors from GMS countries spend comparatively less time and money in the country. The results are also supported by our 2009 visitors' expenditure survey, where GMS visitors spend less in the Lao PDR (see Table 4.4). This is because Lao PDR is regarded as a secondary tourist destination in the GMS (Harrison & Shipani, 2007).

Table 6.3 Stakeholders' perception on the types of tourism businesses taking place along the economic corridors in the Lao PDR.

Types of tourism businesses	Percentage agreement (n=22)	Rank
Hotels and accommodation	96	1
Local handicrafts, souvenirs	64	2
Transport, travel/tour agencies	55	3
Gas stations and shopping centres	50	4
Other small and medium scale businesses	41	5

Source: Tourism stakeholders' interview, 2009

Table 6.4 shows the stakeholders' perceptions of the major linkages and impact of the tourism sector on the different economic sectors of the Lao PDR. The great majority of interviewed stakeholders (91%) said that the accommodation sector benefitted most from tourism followed by the agriculture and food manufacturing sector. Seventy seven percent of the interviewed stakeholders believed that the handicraft industry also benefitted and 68 percent said the tourism sector had significant impacts on the restaurant and food manufacturing sectors. Sixty four percent of the stakeholders believed that growth of tourism in the country contributed to the transport and communication sector followed by retail trade sector (59%).

Table 6.4 Stakeholders' perceptions of the major linkages and impacts of the tourism sector on the different economic sectors of Lao PDR.

Major linkages and impact of tourism to different economic sectors	Percentage agreement (n=22)
Accommodation/hotel sector	91
Agriculture and food manufacturing	82
Handicraft industry	77
Restaurants	68
Transport and communication	64
Wholesale and retail trade	59
Awareness to conserve nature and preserve cultural identity	50
Financial sector (banking, insurance, etc.)	46
Construction and real estate business	32

Source: Tourism Stakeholders' Interview, 2009

In terms of imports for the tourism sector, the interviewed stakeholders (73%) suggested that the Lao PDR's tourism sector was "heavily dependent" on imports, and 18 percent of the stakeholders said the sector was "mostly dependent" on imports of foreign goods and employees. The I-O results also revealed that the multiplier leakage ratios of the tourism sector were estimated as 28 percent in 2008 and 24 percent in 2003 (see Chapter 4).

The Lao PDR relies on imported luxury goods and food and beverages but recently many food products and handicrafts were supplied domestically to the tourism sector. Foreigners who work in the country's tourism sector are in top hotel management, tour agencies and advisors or experts to the national tourism board. Most of the foreign workers are from Thailand, Malaysia, Singapore, China, Vietnam, USA and Europe. The interviewed stakeholders acknowledged that the country needs to engage more foreign workers to improve service standards, develop quality tourism products and improve hospitality expertise. The interview results revealed that the country's local agricultural products are mostly organic but the production scale is small. Local producers cannot supply food products regularly to the hotels and restaurants and the sector has to rely on imported goods. During the interview one interviewed stakeholder commented:

> *"Employing foreign experts and importing tourism goods are not major problems for the Lao PDR. There is also a significant amount of domestic products consumed in the tourism sector. However, if the country prioritizes on nature based tourism or ecotourism; the country can reduce the dependency on foreign workers and employ more local people. At this stage, foreign workers in the tourism sector are essential for imparting knowledge, the transfer of technology and improving the hospitality skills of the Lao tourism professionals."*

6.1.4 Positive and negative impacts of Lao PDR tourism sector

Table 6.5 shows the interviewed stakeholders' perceptions of the major socio-economic impacts on the tourism sector in the Lao PDR. In terms of positive impacts, 82 percent of the interviewed stakeholders reported that tourism brought positive impacts such as income generation for the community people and 86 percent believed that it is a good source of foreign currency earnings for the government. Further, 68 percent of the interviewed stakeholders claimed that tourism has encouraged the community to develop an understanding of and preservation of their culture and history in the country.

In terms of negative impacts of the growing tourism sector in the country, 77 percent of the interviewed stakeholders believed that the Lao people are slowly adopting new cultures and 64 percent claimed that the residents were duplicating unacceptable behaviour from visitors,

which is harmful to the society (see Table 6.5). The interviews also identified other negative impacts such as increased prostitution and human trafficking (59%) and the country becoming a cheap holiday park among the GMS countries (55%).

Table 6.5 Stakeholders' perceptions of the major socio-economic impacts of tourism in the Lao PDR.

Positive impacts	**Percentage agreement (n=22)**
Foreign currency earnings for government	86
Income generation for community people	82
Understanding and preservation of own culture	68
Openness and exposure	55
Increased production of agriculture and manufacture goods	41
More investment (domestic and foreign)	32
Negative impacts	
Adaptation of new cultures among residents	77
Destruction of natural resources/heritage (carrying capacity)	68
Bad behaviour from tourists (drugs, alcohol, half naked)	64
Growing prostitution, human trafficking	59
Becoming a cheap holiday destination in the region	55
Increased criminal behaviour among residents	27

Source: Tourism stakeholders' interview, 2009

One of the major negative impacts is on the cultural and natural heritage sites in Luang Prabhang, where it has reached the point of not accepting more international visitors. Because the main attractions of the country are cultural and natural heritage sites, stakeholders were concerned that these heritage sites will be adversely affected with limited resources and management effort from the Lao PDR government.

6.2 Regional tourism and tourism marketing and promotion in Lao PDR

Table 6.6 shows the interviewed stakeholders' perceptions of the initiatives in promoting tourism of the Lao PDR. The interviews revealed that 77 percent of the stakeholders believed that LNTA engaged in the preparation of promotional materials on tourist destinations but 59 percent believed that the development of the national tourism brand identity (Laos: Simply Beautiful) was another milestone in the marketing and promotion of tourism by the Lao PDR government. Fifty nine percent of interviewed stakeholders suggested that the country participate regularly in domestic and international travel and tourism fairs. Similarly, 73 percent of the stakeholders said that the country is emphasizing the development of ecotourism sites and bringing in the local community to manage tourist destinations in the country.

Table 6.6 Stakeholders' perception of the efforts in promoting Lao PDR tourism.

Tourism promotion initiatives	Percentage agreement (n=22)
Promotional materials on tourism destinations	77
Ecotourism sites development and management	73
Development of own logo and brand identity	59
Participation on international tourism fairs	59
Human resources and capacity development	46
Long term tourism development strategy	41

Source: Tourism stakeholders' interview, 2009

The Lao PDR government has developed the National Tourism Strategic Plan (2006-2010) (LNTA, 2005a) and the Provincial Tourism Strategy Plan (2006-2010) (LNTA, 2005b) to implement tourism programmes in the country. Although the strategies have been developed by the top-down approach, the country is promoting new tourist destinations involving community people and the private sector. The interviewed stakeholders recommended that the country should prioritize its tourism themes, with regard to culture, casinos, sports, nature, community-based or different types of tourism before the government, private sector and external agencies invest in marketing and promoting that particular tourism in the country.

The country has recently formed the National Tourism Marketing Board of 11 members; five each from the government and private sector chaired by the Tourism Minister. The LNTA and some NGOs (such as Green Discovery, Eco-lodge and Ecotourism Laos), communities and the private sector at the national level and MTCO and the ADB at the GMS level involved in promoting Lao PDR tourism in international markets.

6.2.1 Tourism brand identity and logo at the national and regional level

From the stakeholders interviews, 64 percent of the interviewed stakeholders believed that the Lao PDR tourism brand "Laos: Simply Beautiful" has impressed most stakeholders but 23 percent of the stakeholders said that the brand was not attractive enough and 14 percent believed that the brand did not contribute to the growth of the tourism sector.

One of the major initiatives of Lao PDR tourism over the years has been the development of its own brand identity and logo to the global travel market. "Laos: Simply Beautiful" brand name was defined by various stakeholders after rigorous exercises by LNTA with the private sector. The brand conveys the message that the country is embracing the natural beauty and the diversity of cultures in the country. On the other hand, the design of the logo in the brand includes one of the country's popular Buddhist Stupa (That Luang) and the Champa (national) flower. The logo portrays the country's beauty, nature and people.

The interviews revealed that the Lao PDR government allocates a limited budget for marketing tourism and the sector has not done as much as it should. The country often used lack of funds as an excuse for not promoting tourism in international markets. The interview results suggested several ways to promote tourism such as mobilizing social networking media and the private sector. In the last decade, the country has had two tourism brands namely "The Jewel of the Mekong" and "The Real Asia" with their different logos. They failed to impress international visitors and tourism stakeholders. Multiple brands and logos may create confusion and failure in the marketing and promotion of tourism. The interviewed stakeholders said that the best way is to stay with the current brand "Laos: Simply Beautiful" at the national level and "One River: Six Countries" at the GMS level for marketing and promotion.

6.2.2 Mekong brand tourism's contribution to Lao PDR tourism

The interviews recorded that 73 percent of the interviewed stakeholders believed that the Mekong tourism brand, One River: Six Countries, is not marketed or communicated to the desired market globally because of the lack of funds. However, 27 percent of the interviewed stakeholders indicated that it is well marketed and communicated to possible markets. The concept of branding Mekong tourism, "One River: Six Countries", is attractive but there is a need to involve the private sector to make it a success. The Mekong brand tourism is developed to provide complementary advantages to the national tourism brands of the GMS countries. In terms of GMS tourism marketing cooperation, the interviews revealed that 86 percent of the stakeholders said GMS tourism marketing is very important for the Lao PDR.

The visitor arrivals trend in the GMS over the years shows that most visitors, especially the long haul tourists, are from Europe, North America, East Asia and the Pacific (see also Chapter 4). Their intention is to visit the primary destinations such as Thailand, Vietnam and Cambodia. Therefore it is important that the Lao PDR promotes and markets tourism jointly with other GMS countries. Visitors from the GMS countries are considered regional tourists and spend comparatively less time in the Lao PDR.

Table 6.7 shows the stakeholders' perceptions of the impact of the Mekong brand tourism on Lao PDR's tourism. Most interviewed stakeholders (77%) believed that promoting Mekong brand tourism is cost effective for the individual countries and especially is more beneficial for the Lao PDR, because the country is still considered as a secondary destination for international visitors in the GMS. Similarly, 55 percent of the stakeholders perceived that visitors were interested in exploring virtually untouched tourist destinations in the Lao PDR.

Recently, visitor arrivals in the Lao PDR have increased significantly, benefitting from the GMS tourism marketing efforts.

Table 6.7 Stakeholders' perceptions of the impacts of Mekong brand tourism on Lao PDR tourism.

Impacts of Mekong brand tourism to Lao PDR tourism	Percentage agreement (n=22)
Cost effective for individual country's marketing	77
Joint promotions are more effective as Lao PDR is add-on destination	77
Exploring virtually untouched tourism destination of Lao PDR	55
Marketing brand "Explore Mekong" or "One River: Six Countries"	36

Source: Tourism stakeholders' interview, 2009

6.2.3 Single visa and emerging issues of cross border movement in the GMS

Table 6.8 shows the interviewed stakeholders' perceptions of the single visa and other promising issues of cross border movement of people in the GMS countries. Seventy three percent of the interviewed stakeholders identified the single visa as the most important immigration issue in the GMS development agenda. The interviews recorded that 41 percent of stakeholders identified that an on-arrival and multi-entry visa is the key issue to solve the GMS single visa problem for the time being. The interview revealed little progress had been made on the single visa implementation in the GMS countries.

Table 6.8 Stakeholders' perceptions of the emerging issues of cross border movement of people in the GMS countries.

Emerging issues of cross border movement of people	Percentage agreement (n=22)
GMS-wide single visa	73
Facilitate effective border checkpoint	68
On-arrival and multi-entry visa	41
Vehicle insurance, traffic signage, driving sides	36
Concern about trafficking of natural resources and humans	32
Corruption of border officials	18
Reduce tax barrier	14

Source: Tourism stakeholders' interview, 2009

The legality of driving in the GMS countries, right hand versus left hand side driving, uniform traffic signs and cross border insurance for vehicles and goods were the main problems identified by the interviewed stakeholders that need to be resolved for the better movement of visitors in the GMS. Approximately 82 percent of the interviewed stakeholders regarded the GMS single visa as important to the Lao PDR and only nine percent were against it. Further, nine percent of the stakeholders believed that the single visa scheme is important but difficult

to implement in the GMS countries at present. The GMS single visa for international travellers in the Lao PDR would stimulate cross country travel and be hassle free for the majority of travellers applying for visas from the different embassies. Further, the single visa would encourage travellers to visit the Lao PDR's new tourist attractions and also give the option for international visitors to add new destinations to their trip.

There have been long discussions on the single visa issue in the GMS countries but little progress has been achieved towards its implementation. However, Vietnam is leading the attempts to introduce a single visa to international tourists visiting the CLV countries (Cambodia, Lao PDR and Vietnam), which might be implemented before the GMS single visa. The reasons for the delay are the problems associated with the GMS countries such as political instability in Myanmar, reluctance from China and recent strained relationships between Thailand and Cambodia. The interviews revealed that the single GMS visa might be practical but difficult for the GMS countries to share/adjust fees and revenue. The results of our visitors' expenditure survey showed that the Lao PDR government collected US$17m from visa fees (see Table 3.6) in 2008 and the interviewed stakeholders further reported that the Lao PDR government cannot afford to lose the revenue generated from visa fees.

Table 6.9 shows the constraints confronting the single visa implementation in the GMS countries. The results revealed that 77 percent of the interviewed stakeholders' signalled political problems inherent in the GMS countries for not implementing the GMS single visa and 46 percent believed that visa fees are an easy source of foreign currency that GMS countries want to preserve. Similarly, 59 percent of the stakeholders said that there is no uniformity in visa types and fees for international visitors to the GMS countries, which further hinders the implementation of the single visa in the GMS (see Table 6.9).

Lao PDR's border check points with other GMS countries involve many problems because visitors need to carry their baggage for customs inspection and immigration. Currently, visitors have to check their baggage at both sides of the border and stay in a queue for a significant period of time to process the visa. In terms of EURO STAR and the Singapore-Malaysia train link, the border crossing provisions, such as check-in, collection and inspection of luggage at the final destination, are smoother and easier than for the GMS countries' system. This smoothness and ease is missing in the GMS countries, including the new railway connection between Thailand and the Lao PDR. On a positive note, the interviewed stakeholders revealed that the Lao PDR offers an on-arrival visa to most visitors and a visa fee exemption for all SEA member countries.

Table 6.9 Stakeholders' perceptions of the constraints on single visa implementation in the GMS countries.

Single visa is difficult to implement in the GMS because	Percentage agreement (n=22)
Some political issues inherent among GMS countries	77
No uniformity in visa fees/types among the GMS countries	59
Visa fees are an easy source of foreign currency GMS countries do not want to lose or share	46

Source: Tourism stakeholders' interview, 2009

6.2.4 Tourism promotion and marketing in Lao PDR

Table 6.10 shows the stakeholders' perceptions of the most effective tourism promotion tools in the country. About 91 percent of the interviewed stakeholders perceived that websites-networking sites were the most effective tourism promotion tools followed by tourism guidebooks and brochures (86%). In addition, 68 percent of the interviewed stakeholders said tourism road shows and caravans along the economic corridors had been effective in tourism promotion and marketing. Fifty percent of the interviewed stakeholders believed that 'word of mouth' (friends and families) was among the popular marketing and promoting efforts.

Table 6.10 Stakeholders' perceptions of the most effective tourism promotion campaigns (marketing efforts) in Lao PDR.

Tourism promotion campaign/marketing effort	Percentage agreement (n=22)
Websites/networking sites	91
Tourism guidebooks, brochures	86
Road shows, caravans and tourism fairs	68
Magazines/newspapers	64
TV/Radio	55
Through friends and families (word of mouth)	50
Convention and visitors' bureau	46
Visitors information centres	41
Local visitor's guides	36
"Stay another day" campaign	27

Source: Tourism stakeholders' interview, 2009

During the interviews, the stakeholders said that LNTA cooperates with other GMS countries in different forums for the joint promotion of tourism. For example, the Lao PDR ecotourism website (www.ecotourismlaos.com) is becoming more effective in disseminating tourism information and was the most popular among international visitors. Private sector involvement in tourism innovation efforts, such as "Eco lodge", "stay another day" and "Green Discovery", has brought some interesting tourist destination packages to international

visitors. Public relations are weak and the media are controlled by the Lao PDR government therefore the press/newspapers are not that effective in the country. The government is reluctant to give leadership to the private sector and the other stakeholders (other than public sector stakeholders) believed that there is still lack of leadership in government to lead the country in the tourism management.

LNTA has produced brochures, tourist guide books and updated websites to promote tourism. Another effective method in promoting tourism is newspapers in the international arena. The Lao PDR featured in the New York Times in 2008 as one of the 10 most interesting places to visit in the world (Ecotourism Laos, 2009). Lao PDR won the "international ecotourism spotlight award" for two successive years in 2008 and 2009. The Lao PDR successfully hosted two international conferences on ecotourism in 2007 and 2009 (Ecotourism Laos, 2009) and the interviewed stakeholders believed that these events had attracted many tourism stakeholders and visitors to the country. These promotion campaigns are mostly initiated by the private sector in the country. The promotional activities conducted by big tour companies were also effective and important in promoting Lao PDR tourism.

Table 6.11 shows the international visitors' sources of information for visiting the Lao PDR. The results showed that 75 percent of the respondents received information about the Lao PDR from websites followed by 59 percent through 'travel agents'. Among the sources of information, 'friends and relatives' also made a significant contribution (57%) for international visitor arrivals. 'LNTA' and 'Mekong Tourism Organization' had less influence in providing information to the visitors with 21 and 12 percent, respectively (see Table 6.11). The results indicate that 'friends and relatives', 'travel agents' and 'websites' can be considered as effective sources of information about the Lao PDR for international visitors.

Table 6.11 International visitors' sources of information for visiting the Lao PDR.

Sources of information	Frequency	Percentage agreement (n=417)
Websites	311	75
Travel agents	246	59
Friends and relatives	239	57
Hotels	213	51
Lao National Tourism Administration	89	21
Guide books, TV, Radio	77	19
Mekong Tourism Office	49	12

Source: Visitors' expenditure survey, 2009

6.2.5 GMS cooperation in tourism marketing and promotion

Table 6.12 shows the stakeholders' perceptions of GMS tourism cooperation in Lao PDR tourism. Seventy three percent of the interviewed stakeholders said that the GMS countries, including Lao PDR, should allocate sufficient funds for joint tourism marketing efforts, 59 percent recommended carrying out individual marketing campaigns and 41 percent recommended developing tourism themes such as historic, cultural, architectural and nature based tourism. Sixty four percent said that Lao PDR should involve more of the private sector and less government in tourism management. The interviewed stakeholders recommended that the Lao PDR should focus on standardizing tourism quality products and service delivery, assuring the visitors about the minimum standard of hotel quality, food and guides and interpretation skills of tourist guides and agencies.

Table 6.12 Stakeholders' perceptions on the GMS tourism cooperation.

Form of GMS tourism cooperation for the future	Percentage agreement (n=22)
Allocate sufficient funds from member countries for joint marketing	73
Involve more private sectors and less government	64
Individual country marketing as well	59
Tourism theme development: historic, cultural, architectural and nature	41
Establishment of a charter of sustainable tourism development	32

Source: Tourism stakeholders' interview, 2009

The country can promote tourism through the design of brochures, coordinating with different countries and by establishing GMS information centres at specific tourist destinations and border crossing points. The interviewed stakeholders suggested that the Lao PDR should emphasize tourism cooperation with other GMS countries in protecting unsecured resources such as natural resources, minimizing health risks, and preserving heritage sites and antiques.

6.2.6 Priority tourism attractions and tourism segments in the Lao PDR

Table 6.13 shows the interviewed stakeholders' recommendations on the importance of tourism themes in Lao PDR. Fifty nine percent of the interviewed stakeholders 'strongly favoured' nature and community based tourism and 41 percent 'favoured' the idea. Fifty five percent of the interviewed stakeholders 'favoured' culture and history based tourism and 46 percent 'strongly favoured' that cause. On the other hand, 32 percent of the interviewed stakeholders were 'indifferent' to the development of tourism based on commercial attractions such as golf, amusement parks and casinos and 27 percent 'opposed' the idea but 27 percent 'favoured' it. Regarding religious or sacred sites based tourism development, 55 percent of

the interviewed stakeholders 'favoured' it and 18 percent 'strongly favoured' but 23 percent were 'indifferent' to the idea.

The Lao PDR is one of the most untouched tourist destinations in the GMS, with low key tourism development that is shifting to focus on small scale community based tourism. The interviewed stakeholders revealed that Lao PDR tourism has attracted people in search of rural culture, ethnic minorities, boutique hotels, environmentally friendly accommodation and nature adventure.

Table 6.13 Stakeholders' perceptions of different tourism segments for the Lao PDR.

Tourism types/themes	Strongly opposed	Opposed	Indifferent	Favoured	Strongly favoured
Nature/community based tourism				41%	59%
Cultural and historic sites				55%	46%
Agro-tourism			18%	18%	55%
Commercial attractions	9%	27%	32%	27%	5%
Religious/sacred sites		5%	23%	55%	18%

Source: Tourism stakeholders' interview, 2009

Tourist destinations are complex entities and attractive places should be improved and marketed accordingly. Sometimes the country develops tourist destinations but does not market them well and sometimes they market something that does not exist. This is happening in the Lao PDR tourism sector. The interviewed stakeholders further revealed that the Lao PDR government wants to pursue everything, which makes tourism marketing difficult. Therefore the country should prioritize tourism themes/segments such as culture, casinos/urban based, sports, nature/eco-tourism or a different kind of tourism.

6.3 Tourist destinations and management in the Lao PDR

6.3.1 Tourist destinations in the Lao PDR

Table 6.14 shows the interviewed stakeholders' perceptions of the popularity of different tourist destinations in the country. The interviewed stakeholders selected Luang Prabhang as the most popular tourist destination in the country followed by Champasak Province (Pakse), the southern part of the country, which was regarded as the second most popular destination selected by 82 percent of interviewed stakeholders. Vientiane, the capital, was regarded as the third most popular tourist destination by 68 percent of interviewed stakeholders. Khammoune Province is considered as a popular destination by 64 percent of the interviewed stakeholders and 59 percent recommended Luang Namtha.

Table 6.14 Stakeholders' perceptions of the popularity of different tourist destinations in the Lao PDR.

Tourists attractive destinations	Percentage agreement (n=22)
Luang Prabhang (World heritage site)	100
Champasak Province (Pakse)	82
Vientiane city	68
Khammoune Province	64
Luang Namtha	59
Savannakhet Province	41
Van Vieng	36
Plain of Jars in Xieng Khouang	27

Source: Tourism stakeholders' interview, 2009

Table 6.15 shows the tourist destinations that international visitors' preferred when they visited the Lao PDR. The results showed 97 percent of visitors visited Vientiane followed by 56 percent to Luang Prabhang. The expenditure survey revealed that 39 percent of the visitors like to visit Champasak Province (Pakse), and another 37 percent were interested in visiting Savannakhet Province. Both results showed that Luang Prabhang, Pakse and Vientiane were the most visited and preferred tourist destinations in the country.

The results on the stakeholders' perceptions and international visitors' preferences to visit the tourist destination in the country were similar except for the higher preferences of visitors to visit the capital city, Vientiane. The main reason visiting Vientiane by the majority of visitors was that they must enter the country by Nong Khai border of Thailand and the Vientiane international airport to the capital city through which the international visitors can reach to other tourism destinations in the country.

Table 6.15 Tourist destinations visited by international visitors in the Lao PDR.

Description	Frequency	Percent
Vientiane Capital /Province	404	97
Luang Prabhang (World heritage sites)	235	56
Champasak (Pakse) Province	164	39
Savannakhet Province	152	37
Luang Namtha	110	26
Vang Vieng	74	18
Khammouane Province	64	15
Four Thousand Islands	50	12
Other destinations (not specified)	19	5
Total	**n = 417**	

Source: Visitors' expenditure survey, 2009

Table 6.16 shows international visitors' preferences for the tourist attractions in the Lao PDR. The respondents were asked to identify their main interests and preferences in visiting the country. History and cultural heritage topped the visitors' interests (76%) followed by national parks and protected areas (66%). About 63 percent of the respondents preferred to visit city and urban areas and 55 percent were interested in visiting rural livelihoods and ethnic minorities. Thirty three percent of the respondents were interested in religious and sacred sites and 13 percent in urban centred activities such as casinos and recreation.

Table 6.16 International visitors' preferences on the tourist attractions in the Lao PDR.

Visitors' attractions (theme)	Frequency	Percentage agreement (n=417)
History, culture heritage	315	76
Parks and protected areas	276	66
City and urban areas	264	63
Rural and ethnic minorities	230	55
Religious and sacred sites	139	33
Casino and recreation activities	56	13
Others (not specified)	13	3

Source: Visitors' expenditure survey, 2009

6.3.2 Countries visited by international visitors

Table 6.17 shows the other countries visited by international tourists along with visiting Lao PDR. The international visitors' survey results showed that 23 percent of the international visitors visited only the Lao PDR whereas 77 percent visited different GMS countries besides the Lao PDR on their trip. The survey results showed that 55 percent of the international visitors who visited Lao PDR also visited Thailand on the same trip and another 29 percent made a trip to Vietnam in 2009. The country is considered an add-on destination and does not have long haul international flights and depends heavily on the connecting flights with Bangkok (Thailand), Hanoi (Vietnam), Phnom Penh (Cambodia) and other SEA countries.

Table 6.17 Countries visited by international visitors, 2009.

Description	Frequency	Percent
Lao PDR only	94	23
Thailand	238	55
Vietnam	121	29
Cambodia	98	24
China and Myanmar	58	14
Countries other than GMS	42	10
Total	**n = 417**	

Source: Visitors' expenditure survey, 2009

6.3.3 Decision-making in the Lao PDR tourism sector

Table 6.18 shows the stakeholders' perceptions of the key decision makers in tourism management in the Lao PDR. The results revealed that 73 percent of the interviewed stakeholders believed that both the government and the private sector should be equally involved in key decision-making in the tourism sector and 50 percent said that involving wider stakeholders such as the community, civil society and NGOs would generate better results. Similarly, 36 percent of stakeholders identified the private sector as the best to handle tourism related businesses in the country.

Table 6.18 Stakeholders' perceptions of the key decision-makers in Lao PDR tourism.

Key decision-maker in tourism development	Percentage agreement (n=22)
Both Government and Private sector	73
Government	41
Private sector	36
Community, NGOs and INGOs	27
All above-mentioned stakeholders	50

Source: Tourism stakeholders' interview, 2009

The interviewed stakeholders revealed that the local community has minimal involvement in tourism sector planning and management in the Lao PDR. They recommended that there should be more discussion forums to consult the local community, NGOs and the private sector to actively participate in the country's tourism management. The interviewees suggested that all stakeholders should work jointly because they complement each other for tourism development. The government should formulate and enforce policy, regulations, improve infrastructure, natural resources management, culture protection, and provide education and training in tourism. The private sector should be involved in handling the responsibility for promotion, marketing, investment in tourism sites and facilities' development, such as hotels and restaurants with NGOs and the local community.

6.3.4 Stakeholders' perceptions of the tourism management in the Lao PDR

Table 6.19 shows the stakeholders' perceptions of tourism growth and management in the Lao PDR. Most of the interviewed stakeholders (64%) 'agreed' that increased visitor arrivals had helped to increase investment from domestic and international investors. The interviews also revealed that 50 percent of the stakeholders 'agreed' and another 50 percent 'strongly agreed' that tourism had created jobs for Lao people. Similarly, 55 percent of the stakeholders 'agreed' and 27 percent 'strongly agreed' that increased tourism would help local residents learn and preserve their history and culture. Fifty nine percent of the stakeholders 'agreed' that increased tourism would help to boost country's economy and another 41 percent

'strongly agreed' with the same issue. The interviews also revealed that 46 percent of the interviewed stakeholders 'agreed' and 14 percent 'strongly agreed' that tourism had increased imports of tourism related goods from neighbouring countries. In terms of exports, 68 percent of the stakeholders 'agreed' and 18 percent 'strongly agreed' that tourism had increased exports of local products, which positively impact domestic tourism enterprises in the economy.

Table 6.19 Stakeholders' perceptions of tourism growth in the Lao PDR.

Stakeholders' Perceptions of Tourism Growth	SD	D	N	A	SA
Increased tourism would help to increase investment from domestic and international investors	-	5%	5%	64%	26%
Tourism creates job opportunities for the people	-	-		50%	50%
Tourism promotion is good for the local economy	-	-	5%	36%	59%
Tourism can help agricultural industry gain additional revenues because of forward and backward linkages	-	-	5%	68%	27%
Increased tourism would help local residents learn and preserve more about the country's history and culture	-	5%	13%	55%	27%
Increase tourism has helped to increase the number of tourism entrepreneurships along the corridors	-	-	14%	59%	27%
Increased tourism would help to boost the economy	-	-		59%	41%
Bringing tourism would help earn foreign currency	-	-	9%	36%	55%
Tourism can provide an alternative sources of income for the people residing along the economic corridors	-	-	23%	50%	27%
Tourism has increased the imports of tourism related goods	-	-	41%	45%	14%
Tourism has increased exports of local products impacting tourism enterprises positively in the Lao PDR's economy	-	5%	9%	68%	18%

Source: Tourism stakeholders' interview, 2009
Note: SD = Strongly disagree; D = Disagree; N = Neutral/indifferent; A = Agree; SA = Strongly agree

Table 6.20 shows the perceptions of the interviewed stakeholders on the impacts of tourism in the Lao PDR. The interviews showed that 68 percent of the stakeholders believed tourism had 'better' impacts and 32 percent 'much better' on the opportunities for income and revenue generation in the country.

Table 6.20 Perceptions of stakeholders on the impacts of tourism in the Lao PDR.

Stakeholders Perception on impacts of tourism	MW	W	SS	B	MB
Opportunities for revenue for stakeholders	-	-		68%	32%
Opportunities for employment	-	-	5%	59%	36%
Opportunities for shopping for country people	-	-	46%	50%	4%
Prices of goods and services	9%	59%	18%	9%	5%
The cost of land and housing	18%	64%	14%	4%	-
The growth of local business/industry	-	-	5%	68%	27%
Revenues for local government	-	-	-	55%	45%
Opportunities for recreation	-	5%	14%	59%	18%
The image of the country	-	-	5%	68%	27%

Source: Tourism stakeholders' interview, 2009
Note: n=22; MW = Much worse; W = Worse; SS = Stay the same; B = Better; MB = Much better

In terms of employment, 59 percent perceived that opportunities for employment were 'better' and 36 percent said 'much better' as the result of tourism growth. However, 59 percent of the stakeholders said prices of goods and services were 'worse' and 64 percent believed that the cost of land and housing was 'worse' than before (see Table 6.20). Similarly, 68 percent of the interviewed stakeholders believed that the growth of local business, revenue for local government (55%), opportunities for recreation (59%) and image of the country (64%) were 'better' as the results of tourism growth in the Lao PDR.

6.3.5 International visitors' satisfactions of Lao PDR tourism

Table 6.21 presents the results of international visitors' satisfaction with their visit to Lao PDR compared with their expectations. In overall satisfaction level, 26 percent of the respondents between 45-60 years old (mean value of 3.74) were more satisfied compared with 49 percent of the respondents between 31-45 years old (mean value of 3.68) in their latest trip to the country. Likewise, visitors in the age group between 18-30 years old and over 60 years old achieved a mean value of 3.60 and 3.85, respectively for satisfaction level in visiting the Lao PDR. The results showed that female international visitors (mean value 3.75) were more satisfied than male visitors (mean value 3.63) in all four age categories. Both male and female international visitors of higher age were more satisfied during their trip to the country.

Table 6.21 International visitors' satisfaction with the Lao PDR trip compared with their expectations, 2009.

Gender	Age group	Mean	Std. Deviation	n
Male	18-30 Years	3.566	0.626	30
	31-45 Years	3.603	0.739	106
	45-60 Years	3.690	0.744	84
	More than 60 Years	3.714	0.825	14
	Sub-total	**3.636**	**0.729**	**n = 234**
Female	18-30 Years	3.622	0.813	53
	31-45 Years	3.767	0.682	99
	45-60 Years	3.920	0.702	25
	More than 60 Years	4.166	0.752	6
	Sub-total	**3.759**	**0.731**	**n = 183**
Total	18-30 Years	3.602	0.748	83
	31-45 Years	3.682	0.715	205
	45-60 Years	3.743	0.737	109
	More than 60 Years	3.850	0.812	20
	Total	**3.691**	**0.732**	**n = 417**

Note: Std. Deviation = Standard Deviation
Source: Visitors' expenditure survey, 2009

6.4 Main problems/obstacles to tourism management in the Lao PDR

Most interviewed stakeholders said that the common problems and obstacles to Lao PDR tourism include degradation of natural resources, lack of skilled staff, growing prostitution and human trafficking, unsafe migration, loss of control of the developments, the influence of foreign countries, the lack of networking and coordination among provincial and national government and the private and public sectors. For example, Luang Prabhang, the most popular tourist destination in the Lao PDR, is experiencing uncontrolled development work and excessive visitor arrivals that are putting the destination at risk (vulnerable).

Table 6.22 shows the interviewed stakeholders' perceptions of the problems and obstacles in the tourism sector in the Lao PDR. Eighty two percent of the interviewed stakeholders claimed that the low level of capacity building, management and poor service delivery restricted tourism development in the country followed by a lack of new tourism infrastructure development (73%) and a low level of domestic and foreign investment (59%). Similarly, 68 percent of the interviewed stakeholders said that there were limited budgets the tourism product development and marketing in the country. In addition, 41 percent of the interviewed stakeholders identified the lack of efficient coordination between the private and public sectors in the country's tourism sector.

Table 6.22 Stakeholders' perceptions on the problems and obstacles of the Lao PDR tourism.

Problems and obstacles	Percentage agreement (n=22)
Low level of capacity building, management and service delivery	82
Lack of tourism infrastructures/new site development	73
Limited budget in product development and marketing	68
Lack of investments in tourism sector	59
Not targeted enough for specific tourism	46
Lack of efficient coordination between private and public sectors	41
Duplications among the tourism activities and attractions	32
Lack of policy and vision	32
Lack of information centres in many tourist destinations	27

Source: Tourism stakeholders' interview, 2009

Table 6.23 shows the interviewed stakeholders' perceptions of the important issues to be considered for the development of the country's tourism sector. The results showed 82 percent of the interviewed stakeholders recommended that the country should focus on the development of new tourist destinations as well as the improvement of existing destinations to attract international visitors. Sixty eight percent of the interviewed stakeholders identified that

the country should improve the quality of the hospitality services by providing formal education and training to tourism sector employees and 64 percent said marketing and promoting the uniqueness of Lao PDR tourism was the most important issue to be considered. Similarly, 55 percent of interviewed stakeholders perceived that development of a separate tourism institute/school or introducing tourism academic and vocational curricula at university should be considered for tourism development in the country.

Table 6.23 Stakeholders' perceptions of the primary issues to be considered by Lao PDR tourism sector.

Primary issues of Lao PDR tourism sector	Percentage agreement (n=22)
Tourist destination development and improvements	82
Improve quality of service by tourism training and formal education	68
Marketing and promotion of Lao PDR uniqueness globally	64
Participate and empower community people for tourism development	59
Develop separate tourism institute in the country	55
Define the priority of types of tourism (nature, culture, sports, etc.)	41
Facilitate and regulate private investment	36

Source: Tourism stakeholders' interview, 2009

Table 6.24 shows the interviewed stakeholders' perceptions of the problems in tourism growth and management in the Lao PDR. All interviewed stakeholders believed that human resources development was the biggest challenge for the country's tourism development at all levels. The interviewed stakeholders identified that the National University of Laos' tourism programme cannot cope with the increasing demand of Lao young people who are keen to join the sector. The interviews revealed that 77 percent of the interviewed stakeholders said that the country is facing problems with the lack of investment and marketing of tourism in targeted markets. Further, 68 percent of the interviewed stakeholders believed that the lengthy immigration procedures were other obstacles faced by the Lao PDR tourism sector.

Table 6.24 Stakeholders' perceptions of the problems and obstacles in the tourism sector in the Lao PDR.

Problems/obstacles in tourism growth and management	Percentage agreement (n=22)
Human resources development	100
Investment/finance	77
Marketing and promotion	77
Immigration procedures	68
Transportation network	55
Tax/customs	32

Source: Tourism stakeholders' interview, 2009

The interviewed stakeholders believed that the tourism sector will be fast growing for years to come in the Lao PDR. The country is continuously trying to expand its tourism sector; however, the carrying capacity of the country's tourism resources should be considered for its sustainable management since the country has received more than two million international visitors in each year in 2009 and 2010 (LNTA, 2010). Most tourist destination sites in the country are targeting more visitors instead of quality visitors with longer duration of stay and higher expenditure. The interviewed stakeholders recommended that tourist destinations should focus on the quality of tourists to generate more income to preserve the heritage and environment within its carrying capacity.

6.5 Chapter summary

The findings of this study have revealed that the increased visitor arrivals and tourism receipts during 2003-2008 have generated significant economic activity in the country. The tourism activities have expanded businesses, with new employment created, as well as contributing to an increase in household income and government revenue in the country. The interviewed stakeholders identified income generation for the community, foreign exchange earnings for the government and increased production of goods and services as well as employment creation at the local and national level as positive impacts brought about by tourism. However, tourism also brought negative impacts, such as cultural change, growing prostitution, human trafficking and the degradation of natural and heritage sites in the country.

The GMS single visa is important and will stimulate cross country travel for the international visitors in the country. However, it faces implementation problems such as difficulty in implementing the agreement and problems in sharing the visa fees among the member countries. The coordinated marketing and promotion of the national and regional tourism brands will help to achieve the tourism development targets of the country. A tourism related website, guide-books, brochures and road-shows are effective tourism promotion tools in international markets. Nature-community based tourism and cultural-heritage based tourism are the two most important tourism themes identified and Luang Prabhang, Pakse and Vientiane are the most visited and preferred tourist destinations in the country. Lack of human resources, investment and promotion of tourism to international markets are some of the obstacles identified by stakeholders. To address these issues the country should significantly invest in developing and strengthening human resources by establishing a tourism institute or school, improving the standard of services, developing quality tourist destinations, and effective coordination among different stakeholders in the country's tourism sector.

Chapter 7
Summary of Major Findings, Conclusions and Policy Implications

This chapter summarizes the study and draws conclusions by revisiting the results of the economic impacts of tourism on the Lao PDR economy. The first section discusses the summary of the major research findings. Research conclusions are presented in section two. Section three presents possible policy implications for the country's tourism sector. Section four outlines the limitations of this study followed by some thoughts for future research.

7.1 Summary of findings

7.1.1 Research Objective One: visitors' socioeconomic characteristics, economic multipliers and total economic impact of tourism

Between 2003 and 2008, the international visitor arrivals and receipts increased significantly in the country. More visitors' expenditure means more money re-circulated in the economy with more multiplier effects resulting in higher economic impacts in the economy. The findings revealed that the economic impact of tourism varied by visitors' country of origin. Europe, North America, SEA countries, East Asia and Thailand are the major source markets for Lao PDR's international tourism. Europe, North America, SEA, East Asia, and the Pacific contributed comparatively lower arrivals but higher tourism receipts to the economy. The visitors from the five GMS countries contributed higher arrivals but less total receipts to the economy because of their shorter stay and lower per capita daily expenditure.

The results show that the visitors spent most on accommodation, food and beverages, and retail trade. The visitors' expenditure in local transportation was small. This is because visitors from neighbouring countries (such as Thailand, Vietnam and Yunnan-China) used their own vehicle to visit the Lao PDR. Further, long haul visitors may be purchasing air tickets from their country, which results in lower direct expenditure on transportation in the Lao PDR. The results also show that overnight visitors had a greater impact on accommodation and entertainment and recreation and day visitors on retail trade and food and beverages. Visitors who stayed longer spent more thereby increasing the tourism income to the economy. This results in higher multipliers and higher direct, indirect and induced impacts. For example, in 2009, the average length of stay of a tourist was 6.83 days, with a per capita expenditure about US$36 and total arrivals of 1.74 million in the country. The

results suggest that if the average expenditure is increased by four dollars a day and the average stay by one day then the economy will receive additional receipts of US$200m per annum from the two million tourists currently visiting the country.

The primary tourism sectors, such as recreation and entertainment, and retail trade produced higher output multipliers whereas the food and beverages and recreation and entertainment sectors exhibited higher income multipliers. Retail trade, food and beverages, and entertainment sectors showed higher value added multipliers. Similarly, the accommodation, food and beverages, and recreation sectors produced higher employment multipliers among the seven primary tourism sectors. The accommodation and retail trade sectors exhibited higher import multipliers indicating significant leakages from these sectors' activities.

Tourism contributed more to the national GDP in 2008 than in 2003. However, the tourism multiplier leakage ratios exhibited relatively higher value in 2008 (28%) than in 2003 (24%). This is because the growth of tourism imports increased at a greater rate than the growth of intermediate activities and the exports in the latter year. Overall, the service sector's contribution to the value added was higher than the agriculture and industry sectors in 2008. The value added by the tourism sector increased at higher rate than the overall national value added annual increment for the same period.

The higher output multiplier in 2008 indicated that the tourism sector relied more on the country's domestic production system. For every dollar spent by a tourist the total output generated 1.54 (2008) and 1.41 (2003) times in the economy. This indicated that the sector generated more output by 13 cents per dollar expenditure as total outputs from the economy in 2008 than 2003. In other words, a one dollar visitors' expenditure multiplied 1.54 times in the economy in 2008. Tourism generated significantly higher output than the average output of all economic sectors in the Lao PDR for both years. Fletcher (1989) reported tourism output multiplier rates across the globe range from 1.39 in Samoa to 2.96 in Turkey and Mazumder et al. (2009; 2011) found the tourism output multiplier was 1.42 in Malaysia.

The study findings show that tourism output multipliers are larger than those for the industry and agricultural sectors in the country. This is because the service sectors are more labour intensive and the majority of the direct cost goes to purchase raw materials and other inputs in the agriculture and industry sectors. A study by the University of Vermont (1999) revealed that larger geographic areas will have higher multipliers because of more diversified

economies and less leakage. Multipliers will be lower in smaller nations such as Lao PDR because tourism spending may be subject to more leakage (Frechtling & Horvath, 1999).

The high output multiplier of the tourism sector also revealed that the sector provided a stimulus effect to increase the output of other economic sectors, such as food and beverages, wholesale and retail trade, agriculture and livestock and banking and finance. However, the tourism income multiplier is small, revealing more imports, and the sector is not particularly significant for income generation due to skill shortage, and tax and imports are relatively high in the sector. The low income multiplier implies that tourism's primary impacts created larger income effects than the indirect and induced impacts. The low income multiplier of tourism also showed that the sector significantly depends on foreign employees resulting in a high level of income leakage from the economy.

The large value of the import multiplier shows that the tourism sector depends significantly on the import of tourism goods and services in the country. Frechtling and Horvath (1999) reported that a large value of the import multiplier is associated with a large output multiplier. The Lao PDR tourism sector exhibited high import and large output multipliers for both years in our study. Tourism imports were higher in 2008 than in 2003 implying that domestic suppliers were constrained in their capacity to deliver the regular and required quantity and quality of tourism goods and services in the country. Lejarraja and Walkenhorst (2007) and Heng and Low (1990) emphasized that tourism linkages require a broad array of supporting services and manufacturing sectors in order to minimize the leakage. Nevertheless, tourism is an important sector in generating business tax revenue and contributed 8.4 percent to the Lao PDR's total tax revenue in 2008 because the visitors' consumption can be taxed efficiently.

The services sector was the most important sector in 2008 replacing agriculture which created the highest employment in 2003. The tourism sector ranked as the fourth largest sector in terms of employment in 2003 and improved to third in 2008. Furthermore, the tourism sector created the highest number of new jobs among the 14 economic sectors observed during the study period. The results indicate that the tourism sector is labour intensive, whereby a high percentage of the revenue goes to wages and salaries that make the indirect and induced impacts very important in the economy. The large employment multiplier in the tourism sector is due to the combined effects of the low-skilled people available for the jobs and the high dependence on foreign workers in the country's tourism sector. Similarly, the higher indirect and induced impacts in the tourism employment suggest that there was more employment generated by the indirect impacts of the tourism sector in 2008 than in 2003. The

significant indirect employment increment in the tourism sector revealed that the sector was purchasing and selling its products and services within the economy.

The findings demonstrated that in 2008, tourism accounted for US$424m in output, US$94m in income and US$119m in value added in the country's economy. Specifically, for every million dollars spent by the visitors in the country, an additional US$544,260 worth of output is generated, personal income increases by US$344,780, value added created is US$412,060, tourism business taxes increase by US$139,600 and 68 direct and 41 indirect jobs are created in the country's economy.

The results showed that the tourism sector generated higher effects of 1.38 (1.29: 2003), 1.77 (1.53: 2003) and 2.26 (1.89: 2003) as direct, indirect and induced impacts, respectively, in 2008. The visitors' expenditure of US$275m generated US$382m direct, US$489m indirect and US$624m induced impacts in the economy in 2008. Further, the LNTA (2010) has projected the gross tourism receipts to be US$326m in 2013, US$364m in 2015 and US$457m in 2020. Given these indicators, any changes in the tourism sector significantly affect the economy-wide impacts in the output, income, employment, import and value added parts of the economy. For example, to fulfil the LNTA's projected additional tourism demand of US$85m by 2013, our study estimated that the economy must produce US$131m of total outputs. To meet this tourism demand, the tourism sector must produce 67 percent (US$87m) and the inter-linked sectors must produce 33 percent (US$44m) of the total outputs.

The results revealed that both the normal and ratio multipliers were higher for the tourism sector than most of the other economic sectors in 2008. The higher ratio multipliers reflect the higher secondary effects of outputs in the tourism inter-linked sectors of the economy. Comparing the tourism economic indicators between 2003 and 2008, the findings of the output, value added and employment multipliers showed that the tourism sector influences the economy more substantially and the domestic economy was more diverse in 2008.

7.1.2 Research Objective Two: interdependency, inter-industry linkages and key sector identification

Using the Chenery-Watanabe and Rasmussen-Hirschman linkage methods, the findings revealed that the average backward and forward linkages for tourism increased between 2003 and 2008. This shows an increasing degree of sector interdependence together with high economic growth and more diverse economy during the study periods. Tourism generated 24 cents more secondary (indirect and induced) impacts, domestically, in 2008 through inter-industry linkages than in 2003 from a dollar's expenditure by a visitor. This indicates that the

tourism sector interaction with other economic sectors increased significantly. Tourism was among the top three sectors classified as strong backward-oriented sectors together with transport and communication, and electricity and water supply for both years. Backward-oriented sectors support employment and output in the sector's value chain (Beynon et al., 2009). The tourism sector's higher backward linkage value is associated with the high employment and larger output indicating that the sector purchases higher amount of inputs from the economy than other sectors.

The high linkage effects of the tourism sector offer greater potential to stimulate the economic activity and therefore have a greater effect on the country's economic growth. This implies that tourism, as a purchaser of inputs, increased more than the average of all economic sectors in the economy for both years. The economic sectors that exhibit higher backward linkages are the sectors that are more connected with the industrial sectors (Azad, 1999). In terms of the forward linkages, the tourism sector ranked fifth out of the 14 economic sectors for both years. The average level of the forward linkage index indicates that the sector has medium capacity to sell its products to other sectors and the sector inputs are mainly used for personal consumption and providing final goods to the economy. Tourism is one of the four sectors that had a high backward linkage value for both years in the economy.

The industry sector does not have particularly strong linkages with the rest of the economy except the food and beverages manufacturing sector, over the study period, although the sector continues to rely on imported inputs. Furthermore, the industry sector is underdeveloped and largely dominated by the mining and quarrying sector. The agriculture sector produces traditional products with low levels of value added from subsistence farming in the country. Mining and quarrying (industry) together with the forestry and logging (agriculture) sector do not possess great inter-industry linkages although both sectors produce the highest level of outputs and are self sufficient in the economy. This is because the majority of their products were exported to other countries. The construction and banking and finance sectors grew fast but relied significantly on imported goods and foreign employees, so registered lower inter-industry linkages in the economy. Thus tourism together with the wholesale and retail trade, and electricity and water supply are the most improved sectors between 2003 and 2008 in terms of exhibiting high inter-industry linkages.

The results show the tourism sector ranked third in 2008 based on the total linkages. Total linkages provide an alternative basis for comparison; the sectors which have the greatest values are considered key sectors of the economy (Sonis et al., 1995). High total linkage

coefficients are concentrated mainly in tourism, the wholesale and retail trade, agriculture and livestock and transport and communication sectors in 2008. This implies that these sectors have been dominant in the country's economy during the study period. Tourism falls into the group of 'strong backward linkage' sectors in the economy. The more inter-industry linkage exists between tourism and the general economy, the more innovative the tourism cluster will be (Lejarraja & Walkenhorst, 2007). The economic sectors with relatively high linkages offer greater potential to stimulate the economic activity of the other sectors and therefore have a greater effect on the country's economic growth (Jones, 1976).

In terms of weighted linkages, the tourism sector ranked eighth in 2003 and improved to sixth in 2008 among the 14 economic sectors. Similarly, the tourism sector ranked seventh in 2003 and moved up to sixth based on pure linkages value in 2008. The increasing trends of both weighted and pure linkages values show that the tourism sector had a greater reliance on intermediate inputs in 2008 than in 2003. The findings of the pure and weighted linkages were similar and revealed that the sector was considered an average performing sector which exhibited medium capacity to increase the inputs from the rest of the economic sectors.

In terms of the I-O MPM findings, tourism was the third most important sector based on the hierarchy of the backward linkages for both years in the economy. The results revealed that the transport and communication and electricity and water supply sectors together with tourism, achieved higher positions in the hierarchies of backward linkages than the average hierarchies of all economic sectors. The I-O MPM findings showed that tourism together with transport and communication and electricity and water supply sectors were considered key sectors. For example, based on the I-O MPM approach, the service sector has two key sectors in 2003 and three sectors in 2008 out of the five key sectors identified in the economy.

The findings indicate that the tourism sector was less self sufficient in 2008 than in 2003 due to the increased imports of tourism in the latter year. The lower SSR values of the tourism sector in both years revealed that the sector significantly depended on imports of goods and services. Therefore the tourism sector is viewed as an import-based industry and there were significant income leakages through the economy. Overall, the average value of the SSR of the service sectors was significantly lower than the industry and agriculture sectors in the country. The agriculture sector is considered self sufficient but the industrial and service sectors are less self sufficient to satisfy the domestic demand. Comparing the SSR value of this study with Secretario et al.'s (2009) study in Cambodia, Vietnam and Thailand, the Lao PDR economy is less self sufficient to meet the domestic demand than those countries.

One of the common findings of the inter-industry linkage analysis methods used in this study was tourism exhibited strong backward linkages in both years. Based on the MRI approach, the tourism sector ranked third in 2003 and fourth in 2008 in the key sector analysis of the economy. The tourism sector achieved higher scores in both average and total values by the MRI approach in 2008. The common key sectors for both years were tourism, food and beverages manufacturing, wholesale and retail trade and agriculture and livestock. These sectors demonstrated greater values of backward and forward linkages than other economic sectors and possess greater influence through both purchases and sales in the economy.

The findings disclose that the tourism sector has an important role, not only as a foreign exchange earner but also generating its own output as well as the output of the inter-linked economic sectors. The significant backward linkage of the tourism sector showed its influence was widely distributed in the economy. The construction, public administration, personal, social and community services and real estate and business services exhibited weak linkages. These sectors' final demand increments will have significantly lower impacts on the sectors that supply inputs in the production of these sectors' output and characterized by high imports of goods and services and a high level of foreign ownership in the country.

One of the main reasons why the tourism sector exhibited higher multiplier effects than other economic sectors was that the tourism linkages were more spread out over the economy. The respective rankings of the backward and forward linkages of the economic sectors varied with different methods used in our study. This may create inconsistencies from the policy perspective, particularly where a sector is a key sector in one inter-industry linkage approach and not in another. The MRI approach provided consistent results and further insights into the different types of multiplier, linkage and key sector analyses.

7.1.3 Research Objective Three: tourism stakeholders' perceptions, and problems and obstacles of the tourism sector

The economic corridors' development and tourism infrastructure improvement in the country helped the tourism sector to grow significantly during 2003-2008. The findings from the stakeholders' interviews revealed that the accommodation and food and beverages sectors benefitted most followed by the handicrafts, retail trade, travel-tour agencies, service stations and the banking-finance sectors along the economic corridors in the country. These sectors have expanded businesses with new employment created contributing to increase in household income, consumption and government revenue in the country. The interviews revealed that the implementation of the GMS-wide single visa was delayed due to the

difficulty in sharing the revenue, political reluctance and the unwillingness of some of the GMS countries. Although the Lao PDR offers an on-arrival visa to most international visitors and a visa fee exemption for all SEA member countries, the single visa will stimulate cross-country travel of visitors allowing easy access to all GMS countries, including the Lao PDR. The interviews showed that GMS tourism marketing is very important for the Lao PDR as the government lacks sufficient budget for tourism promotion and marketing. The interviews further revealed several options to promote tourism such as mobilizing the private sector, community, social networking sites and media. The national and GMS tourism brands provide complementary advantages for tourism marketing among the GMS countries.

Tourism stakeholders and international visitors considered a tourism related website, guidebooks, brochures, and road-shows as effective promotion tools of the country in the international tourist markets. It is expected that international visitors are more likely to purchase tourism services online in the future. For example, the websites of Ecotourism Laos, Green Discovery and Eco-lodge were effective and popular in disseminating tourism information to the international visitors. These NGOs and community based organizations have promoted some interesting tourist destination packages to international visitors. In addition, one of the most effective tourism promotion tools in the country is by "word of mouth". The interviews revealed that the government should coordinate with GMS countries and establish GMS tourism information centres at specific tourist destinations and border crossing points in promoting tourism in the GMS.

Nature based and cultural-heritage based tourism themes are believed to be the two most important tourism segments in the country. Local and ethnic minorities are empowered and gradually involved in managing the nature and community based tourist destinations in the country. Encouraging and empowering communities, NGOs and the private sector in tourism marketing are the options identified for the country's tourism development. The findings showed Luang Prabhang is the most popular tourist destination followed by Vientiane and Pakse; they are the most visited and preferred tourist destinations by international visitors. LNTA (2009) and Phosikham (2010) also found that the majority of the visitors stayed in Luang Prabhang longer than other places in the Lao PDR.

The interviews identified some tourism related problems such as the destruction of natural resources, lack of skilled staff, growing prostitution, human trafficking and unsafe migration. Further, the loss of control in development, the influence of neighbouring countries, lack of harmonization of border crossings, the lack of coordination among the community, private

and public sectors were other notable problems of the tourism sector. The interviews showed that the lack of human resources, investment and the promotion of tourism to targeted markets were the main obstacles to tourism development in the country. NERI (2007) reported that tourism is one of the eight priority development areas targeted to play a key role in the economic development of the Lao PDR. However, the tourism sector received only 1.7 percent in 2005 (NERI, 2007) and 2.3 percent in 2008 (LNTA, 2009) of the total country's investment. The interviews also showed that lack of investment is one of the major obstacles in the country's tourism sector. In addition, insufficient capacity building, increasing the quality of service delivery and the development of new tourism infrastructure were important issues to be addressed in the country's tourism sector.

7.2 Commonalities of findings of the I-O models and stakeholders' perceptions

The tourism activities created new employment, as well as contributing to an increased in household income and government revenue in the country (see Tables 4.17 and 6.20). The tourism output, employment and value added multipliers were higher than the average multipliers of all sectors for the study period. This indicates the tourism sector increasing dependency on the country's domestic production system (see Table 6.4). The tourism sector ranked third among the 14 economic sectors based on the total linkages for both years. The sector is one of the four sectors that have a backward linkage value greater than one for both years which indicates a positive relationship between the increase in inter-industry linkages and the growth of production activities in the economy (Table 6.19). Increased visitors arrivals and tourism receipts positively impacted the growth of domestic production activities between 2003 and 2008 (see Table 4.5 for macro-economic values derived from the Lao PDR 2003 and 2008 I-O tables). More importantly, the results from the international visitors' expenditure survey, I-O models and stakeholders' perceptions were similar in identifying tourism as a key sector of Lao PDR economy.

7.3 Conclusions

The significant positive relationships among the increase in visitor arrivals and tourism receipts resulted in the growth of sector outputs and increased the multiplier effects in the economy during 2003-2008. This implies that the tourism sector's expansion to the most advantageous markets such as Europe, East Asia, other SEA, America, the Pacific and Thailand, yielded high benefits to the economy. In addition, visitors' expenditure had the greatest impact on accommodation followed by the food and beverages and retail trade sectors which together contributed over two thirds of total expenditure.

Tourism's high output multiplier showed the greater economic diversity and larger size of the economy but small income multiplier indicated a lower income from tourism. Tourism has a major employment impact in that one in every seven people relied on tourism related businesses in 2008 as their major employment. The indirect and induced impacts of tourism were potentially important to the economy indicating that visitors' expenditure circulated throughout the general economy creating ripple effects in the country's economy. However, tourism's high multiplier leakage ratio in 2008 indicated significant leakages occurred in all stages of the direct, indirect and induced impacts of tourism. This restricted further multiplier effects from tourism, which negatively impact the economy. The service sectors grew faster than the agriculture and industry sectors between 2003 and 2008 especially due to the rise of the tourism, wholesale and retail trade and electricity and water supply sectors. Although the tourism sector relies on the import of goods and services, the sector was one of the top contributors to national GDP in 2008 and the sector also contributed significantly to employment, value added, output and tax revenues.

The tourism sector's inter-industry linkages were stronger in 2008 than in 2003 due to the significant increment in the sector's backward linkages. The tourism sector is one of the top four most important sectors; it had one of the highest backward linkages values in all inter-industry linkages measures used in this study. This indicates that there was a positive relationship between the increase in inter-industry linkages and the growth of production activities in the economy. Further, tourism has increased linkage effects more than other economic sectors therefore its expansion is advantageous to the economy. Of the five key sectors, three sectors in 2008 and two in 2003 were from the service sector. The key sector interactions had shifted from the agriculture and industry sectors to the service sectors, indicating the services sectors' domination of the country's economy over the study period.

Tourism, together with the wholesale and retail trade, agriculture and livestock, and food and beverages, were the four common key sectors of the economy for both years. There were substantial linkages between tourism and the rest of the economy therefore the tourism sector is potentially important in creating demand and stimulating production within the sector as well as the inter-linked economic sectors. Overall, the multipliers and linkages results showed that tourism was one of the highest ranked sectors among the country's 14 economic sectors. The higher values of these indicators for the tourism sector showed that the sector has gained more importance during 2003-2008 and the sector was a key sector in the economy.

Tourism stakeholders perceived the significant positive economic benefits brought by the tourism sector to the overall economy creating new employment and stimulating the production of the entire economic sector. The country is gradually developing infrastructure and promoting new tourist attractions, special events, sports and recreation activities and business conference facilities in the country. The economic corridors have enhanced visitors' accessibility although little progress has been made on the GMS-wide single visa implementation among the member countries. The Lao PDR can benefit from the implementation of a single visa by receiving more international visitors coming through GMS member countries. The majority of the visitors who visited Lao PDR also visited Thailand on the same trip and one third of the visitors made a trip to Vietnam in the same year.

The stakeholders' perceptions revealed some concerns and issues for the tourism sector. The growth of the tourism sector has raised awareness among the people and the private sector of the benefits of preserving natural, historical and cultural assets. Additionally, tourism development has also provided recreation and leisure opportunities to local people. Revenues from tourism can be allocated to enhance economic and social benefits, which can lead to nature and cultural sustainability in the country. Some common problems and obstacles in Lao PDR tourism are a lack of skilled employees, growing prostitution, human trafficking, unsafe migration, the influence of foreign countries, the lack of networking and coordination among the community, the private and public sectors. The Lao PDR government is dominant and determines what the private sector and community may do in the tourism sector. The government's assistance in investment and management is crucial for tourism development but the lead role should be given to the private sector and community in tourism.

Our study highlights the country significantly depends on the performance of the tourism sector for its growth. Tourism is a multi-sector industry and its demand impacts several sectors in the economy directly and indirectly. Despite the global economic recession, the growth prospects of the country's economy and tourism remain positive. The ADB estimated the Lao PDR's overall economic growth in 2010-2011 of 8.5 percent to be highest among the GMS countries (ADB, 2011). We can conclude that the economic benefits of the tourism industry are positive and its expansion will stimulate faster economic growth for the Lao PDR. Therefore, the tourism sector can be targeted to play a key role in lifting the country from the list of Least Developed Countries by 2020 as envisaged by the Lao PDR government.

7.4 Research implications

The findings of this research provide some policy guidelines to the Lao PDR tourism stakeholders in developing the tourism sector in the country. The findings of this study have some important implications for academics, researchers, government, private sector, NGOs and the community involved in tourism in the country. The major implications are:

7.4.1 Public sector: LNTA

7.4.1.1 Identifying potential markets, planning and investments

The study shows that the five most advantageous tourist markets for the country are Europe, SEA, East Asia, North America and Thailand. The results suggest that higher impacts can be achieved by increasing visitor arrivals from these markets. The LNTA should adopt distinct marketing policies for Thai and Vietnamese visitors, particularly on expanding their length of stay. Thailand contributes one third of total arrivals and could be considered as the most reliable tourist market for the country even during adverse economic conditions.

The study provides information about the importance of the tourism primary sectors, which should be given more priority in planning and investment. The government should encourage investment in the four key economic sectors with larger output, value added and employment multipliers. These are tourism, food and beverages, wholesale and retail trade and transport and communication. The government should invest in the food and beverages, and recreation and entertainment sectors to increase income from the tourism sector, since these sectors potentially generate the largest income impacts in the economy. Similarly, the government should enhance the production and investment of the wholesale and retail trade, and accommodation sectors to reduce the import of tourism goods and services because these sectors had exhibited the highest import multiplier.

7.4.1.2 Marketing and promotion

Economic multipliers of the tourism sector have measured tourism's impacts and justified its expansion through proper use of the country's limited resources. These indicators could have an important implication for formulating an effective tourism marketing and promotion strategy that requires increased attention. Tourism marketing and management are important because tourism businesses are better handled by the private sector and communities at large. The government should formulate effective fiscal and investment policies that can attract more investment from the different stakeholders in the country's tourism sector. Moreover, the private sector and the community should be given autonomy to take the lead role in marketing and management of tourist destinations in the country.

The results showed significant indirect and induced impacts of the tourism sector on the economy. Therefore, the government should introduce a strategy to promote tourism and other key sectors in the economy that have the potential to stimulate high household consumption from the tourism income. The policy should be directed at the strong inter-linked sectors with tourism, which has significant import and leakage, such as food and beverages, wholesale and retail trade, construction, and banking and finance. Planning and policies should encourage businesses to add value in tourism products and services. Further encouragement of domestic producers to expand and diversify their production structure will enhance import substitutions of the tourism goods and services for the country.

7.4.1.3 Human resources, infrastructure and resources management

The LNTA should formulate and enforce a policy for tourism resources' conservation, heritage and culture protection. This can be established by launching a tourism school or introducing tourism academic and vocational curricula in the country's only university, the National University of Laos. The LNTA should work with other stakeholders to raise the service quality of tourism employees in the country. While formulating tourism economic and management policies, the LNTA should consider minimizing those negative impacts of tourism sector identified in this research.

As the country is wealthy in tourism resources, the LNTA should encourage tourists to visit other parts of the country together with the most popular tourist destinations. To facilitate this, the LNTA should improve existing infrastructure in the tourist destinations to engage the visitors, en-route along the economic corridors in the Lao PDR. The LNTA should coordinate with other GMS countries' counterparts to implement a GMS-wide single visa, strengthen a joint tourism marketing campaign, and establish GMS tourism information centres at specific tourist destinations and border crossing points.

The government can allocate part of the tourism revenue to the management, conservation and human resources in the tourism sector. For example, revenues collected from the visa fees of international visitors could be allocated to tourism marketing, conservation of resources and educating the tourism employees. The diverse tourism resources together with exceptionally good services and proper marketing of tourism to international markets would make up for what is not considered a primary tourist destination in the GMS.

7.4.2 Private sector, local community, donors and regional organizations

Our study findings have provided important information on the benefits of tourism activities for investment and business operational decisions. The private sector can invest in the tourism primary sectors such as accommodation, food and beverages, entertainment and retail trade establishments, which are well inter-linked with the general economy. The projected employment and output of the tourism sector will aid in the planning and evaluation of tourism demand in the country. The agriculture and livestock, construction, retail trade, food and beverages, and banking and finance sectors should maximize their potential to produce the respective estimated outputs to meet the future tourism demand in the country.

The private sector and the community should introduce and promote unique tourism events and festivals to visitors emphasising the nature-community and culture-heritage tourist destinations. This can be achieved by employing local people, thereby reducing the dependency on foreign workers and ultimately reducing income leakages from the country's economy. Community involvement in tourism management and marketing could enhance awareness, sense of identity, empowerment, pride and well-being of local communities. Tourism marketing tools should make use of websites, social networking sites, brochures, and trained tour guides in the country for providing efficient services to international tourists visiting the country. The private sector and the community should step up their tourism service standards based on the study findings.

The findings revealed that the implementation of the GMS-wide single visa will stimulate more visitors to visit GMS countries including Lao PDR. Therefore, regional organizations such as MTCO and the ADB, should provide assistance to the GMS countries to resolve the outstanding issues in implementing the single visa in the GMS countries for international visitors. They can assist the community and the private sector such as by providing education, training and management techniques to upgrade the skills of tourism professionals in the country. For example, educating tour operators and guides would make them accountable for providing accurate information on the country's tourism resources to the visitors.

7.4.3 Academics and researchers

Many developing countries' economies are based on the tourism industry but tourism does not exist as a distinct sector in the national accounts. I-O models offer detailed information about how tourism spending filters through different sectors (Lejarraja & Walkenhorst, 2007). Our study findings contribute to the I-O literature and extend the knowledge in the disaggregation of the tourism sector from rest of the economy. The study enhanced the

procedures for estimating multipliers, linkages and key sector analyses to quantify the economic contribution of the tourism sector in an economy. Therefore, the research method used in our study can be used to estimate the economic impacts of tourism, energy and water supply, which may not be explicitly found in the industrial classifications of developing countries' economies. The partial equilibrium model used in this study would be useful to upgrade the database in line with the general equilibrium context based on the I-O tables in the Lao PDR.

One of the major implications of our study is the 2003 and 2008 Lao PDR I-O table have been constructed to include tourism sector. Further, previous studies have combined all of the 10 indicators (multipliers and inter-industry linkages) to identify the tourism position and its economic impacts in the country. Further, the multi ranked index (modified from Kwaka et al., 2001, 2003) would be useful to other academic and researcher to replicate while estimating tourism impact assessment in the national economy. Further, the study can be replicated to other similar developing countries as Lao PDR such as Cambodia and Myanmar.

7.5 Limitations of the research

Economic impact alone may not provide the total impact of tourism. Our study did not include social and environmental analyses of tourism because of the possibility of becoming a large scale study, lack of data and limited time to address these constraints. Similarly, external costs such as infrastructure, inflation, seasonality, over dependency on tourism and the opportunity costs of the resources involved in tourism sector expansion are not considered in this study. A study that encompassed all these factors could reveal different results. Our study was designed to estimate international tourism's impacts in the Lao PDR; therefore, local visitors' and outbound tourists' expenditure were excluded in this study. Further, the expenditure survey questionnaire might be biased against non-English speaking international visitors since only visitors who could speak and read English were interviewed. Interviewing visitors in different languages was not practical for the researcher while administrating the visitors' expenditure survey. The visitors' expenditure could have been administered in other parts of the tourist destinations such as Savannakhet, Luang Prabhang and Luang Nam Tha of the Lao PDR. This was not possible because of limited time and lack of sufficient budgets for data collection.

Although an I-O model gives an analytical and descriptive analysis of the economic impacts, the model has certain limitations such as trade and technology effects. These effects may cause quick changes in sector outputs during a study period and the production function of the

economic sectors would be non-linear. An I-O model is essentially a linear model (Santos, 2003). Wattanakuljarus (2005) and Pratt (2009) noted that I-O models are not flexible enough to allow for general specifications of the behaviour of consumers, producers and investors. The I-O models assumed that these components remain constant between the two study years which rules out any possibility of the indicators adjusting their input structure to relative price changes in the study years. The I-O model has considerable usefulness for short and medium term planning but the application to long term planning may be limited if the structure of an economy changes quickly over time.

7.6 Future areas of research

The analysis and findings suggest the following topics for future research:

Impacts of socio-environment, cultural heritage and seasonal variation of tourism: The social and environmental impacts of tourism should be addressed in future studies. The impacts of tourism on the cultural heritage sites including market segments and seasonal variations of tourism are other future research areas. The economic impacts of tourism at the provincial level, for example, the economic impact of tourism in Luang Prabhang, the most visited destination of the country, may also be a future area of research.

Extend impact analysis using general equilibrium models in the economy: The 2008 Lao PDR I-O table constructed in this study can be used as the base year data for future studies, for example, the construction of the 2013 Lao PDR I-O table. The I-O table is a major component of the SAM model and an important 'database' for most CGE models (Lindberg, 2011). Therefore, together with the I-O table, the Lao PDR national accounts can be upgraded in the line with TSA, SAM and other CGE applications for wider applicable future research.

Updating tourism statistics and useful for other developing countries: This research may be helpful to the LNTA and NSC to allocate more resources for constructing I-O tables regularly to address the lack of quality data for tourism research. The economic impacts of tourism using I-O models need to be regularly estimated to reveal tourism's contribution and position in the economy. Further, tourism statistics should be upgraded to be compatible with TSA, which has been adopted by other GMS countries such as Thailand and China. Future studies may apply this study's model to other developing and other GMS countries with similar economic characteristics to the Lao PDR to compare the results at the national level.

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Appendix 1

Maps of the Greater Mekong Subregion and Lao PDR

Map of the Greater Mekong Subregion	Map of the Lao PDR
	
Source: Asian Development Bank	Source: Google maps

Appendix 2

Description of the Economic Sectors Classifications in Lao PDR National Accounts

3×3 Sectors		14×14 Sectors		33×33 Sectors		43×43 Sectors	
01	Agriculture	01	Agriculture, fisheries, livestock and poultry	01	Food items	01	Glutinous rice
						02	Ordinary rice
				02	Vegetables	03	Morning glory
						04	Spinach
						05	Cucumber
				03	Meat	06	Pork
						07	Buffalo
						08	Beef
						09	Chicken
				04	Egg	10	Chicken egg
				05	Other food	11	Sugar
						12	Condense milk
						13	Tobacco
						14	Cigarette (A)
				06	Fish	15	Fresh fish and fermented fish
		02	Forestry and logging	07	Forestry and logging	16	Forestry
						17	Logging
02	Industry	03	Mining and quarrying	08	Mining and quarrying	18	Mining and quarrying
		04	Food, beverages and tobacco manufacturing	09	Food processing	19	Food processing
				10	Beverages	20	Beverages
				11	Tobacco	21	Tobacco
		05	All other manufacturing	12	Manufacturing	22	Manufacturing

3×3 Sectors		14×14 Sectors		33×33 Sectors		43×43 Sectors	
				13	Textiles, garments and leather products	23	Textiles, garments and leather products
				14	Wood and paper products, printing/publishing	24	Wood and paper products, printing/publishing
				15	Chemical products	25	Petroleum
				16	None metallic mineral products	26	None metallic mineral products
				17	Metal products, machinery equipment	27	Metal products, machinery equipment
				18	Other manufacturing goods	28	Other manufacturing goods
		06	Electricity and water supply	19	Electricity and water	29	Electricity and water
		07	Construction	20	Construction	30	Construction
				21	Tin roof	31	Tin roof
				22	Cement	32	Cement
03	Services	08	Transport and communication	23	Transport and storage	33	Transport and storage
				24	Post	34	Post
				25	Communication	35	Communication
		09	Wholesale and retail trade	26	Wholesale and retail trade, repairs	36	Wholesale and retail trade, repairs
		10	Banking, finance and insurance	27	Financial intermediation	37	Financial intermediation
		11	Real estate and business services	28	Real estate and business services	38	Real estate and business services
		12	Public administration	29	Producers of government services	39	Producers of government services
		13	Personal, community and social services	30	Personal, community and social services	40	Personal, community and social services
		14	Tourism*	31	Hotel and restaurants	41	Hotel and restaurants
				32	Travel agents	42	Travel/tour agents
				33	Other tourism related services	43	Other tourism related services
	Government Value Added				Taxes on products and import duties, net		Taxes on products and import duties, net

Note: Tourism sector is created in this research after disaggregating from the economic sectors in Lao PDR.
Source: Department of Statistics, Ministry of Planning and Investment, Lao PDR.

Appendix 3

Economic Sectors' Classification and Coding of Lao PDR

	3*3 Sectors	S. N.	Code	14*14 Sectors
01	**Agriculture**	01	AGRILIVE	Agriculture and livestock
		02	FORESLOG	Forestry and logging
02	**Industry**	03	MINEQYAR	Mining and quarrying
		04	FOODBEVE	Food and beverages manufacturing
		05	ALLMANUF	All other manufacturing
		06	ELECWATE	Electricity and water supply
		07	CONSTRUC	Construction
03	**Services**	08	TRANCOMM	Transport and communication
		09	W&RTRADE	Wholesale and retail trade
		10	BANKFINA	Banking, finance and insurance
		11	REALBUSI	Real estate and business services
		12	PUBADMIN	Public administration
		13	PERSERVI	Personal, community and social services
		14	TOURISM	Tourism

Note: S. N. (Sector Number) = Economic sectors' number allocated in this study.

Appendix 4

Fourteen Sectors 2003 Lao PDR Input Output Table

Sector Number		Intermediate Demand														TID
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	
Intermediate Inputs	01	44.40	1.53	1.48	591.52	2.17	1.00	1.00	0.00	0.00	0.02	0.07	1.94	3.30	3.06	651.48
	02	0.36	1.24	0.00	0.05	12.45	4.17	0.01	0.00	0.00	0.00	0.00	0.00	0.33	1.37	19.97
	03	0.00	0.00	0.00	0.00	0.18	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50
	04	95.72	2.94	1.33	12.24	0.00	0.00	2.98	1.48	5.83	0.00	0.00	0.00	1.39	5.21	129.12
	05	97.22	0.00	2.04	13.74	0.00	0.00	0.00	1.50	0.00	1.50	0.00	1.50	2.89	3.46	123.85
	06	2.29	0.04	4.53	1.44	1.13	0.41	0.36	0.09	4.18	0.09	0.23	0.54	1.65	0.84	17.84
	07	2.94	0.00	0.00	1.59	0.12	2.51	0.42	0.11	0.07	0.96	0.00	0.93	4.01	1.29	14.95
	08	1.33	1.25	1.32	2.47	2.98	1.25	1.48	1.24	1.37	1.27	1.24	1.28	1.39	0.35	20.20
	09	20.38	0.41	8.18	50.11	8.99	0.81	26.41	0.25	5.83	1.48	2.51	1.22	12.30	4.35	143.23
	10	2.47	1.24	1.27	9.28	1.10	0.15	2.98	0.19	6.97	1.22	0.07	2.79	0.87	1.24	31.84
	11	2.02	2.00	0.00	0.00	0.02	0.00	0.00	1.94	0.05	1.48	3.14	1.30	1.65	2.00	15.59
	12	0.26	1.76	0.26	0.36	1.53	1.48	0.54	0.99	0.05	1.50	1.48	2.51	2.62	0.05	15.41
	13	3.80	2.38	0.88	4.00	2.04	1.74	4.61	2.73	1.21	0.62	0.93	2.26	0.93	1.94	30.06
	14	12.89	2.18	0.68	1.60	1.84	1.54	11.61	2.53	1.01	0.42	0.73	3.96	0.73	1.24	42.95
	TDI	286.07	16.97	21.97	688.38	34.54	15.05	53.74	13.04	26.59	10.56	10.40	20.22	34.07	26.39	1257.9
	M	123.76	32.90	83.37	45.19	54.31	14.26	142.78	12.84	59.82	12.58	14.10	20.14	91.70	30.69	738.43
	TII	409.83	49.87	105.34	733.56	88.85	29.31	196.53	25.88	86.40	23.14	24.49	40.36	125.77	57.09	1996.4
Value Added	**CE**	253.64	51.32	21.21	94.33	19.12	8.70	69.36	5.69	59.23	6.31	11.68	45.95	35.62	7.84	690.0
	PTX-S	12.15	5.27	5.22	6.62	3.06	1.29	14.73	1.69	14.59	0.00	2.72	1.90	3.60	2.56	75.39
	DEP	53.59	8.88	22.16	39.41	8.19	3.36	32.43	0.81	9.35	1.37	9.86	1.90	10.20	3.22	204.7
	OS	345.32	28.03	19.10	143.15	39.90	11.21	77.39	4.20	92.41	26.65	27.46	6.85	46.65	13.98	882.2
	MTX	8.69	3.16	8.84	4.14	6.64	1.07	14.72	1.15	7.19	1.30	1.48	1.82	8.73	3.27	72.20
	TPI	673.39	96.65	76.54	287.65	76.91	25.61	208.63	13.54	182.77	35.63	53.20	58.42	104.80	30.87	1924.6
TGI		**1083.22**	**146.52**	**181.87**	**1021.21**	**165.77**	**54.93**	**405.16**	**39.42**	**269.18**	**58.77**	**77.69**	**98.77**	**230.57**	**87.96**	**3921.0**

Sector Number	Final Demand					TFD	TGO
	HCE	GCE	GFCF	CI	E		
01	172.49	80.32	74.82	74.35	29.77	431.75	**1083.22**
02	19.62	25.99	16.95	17.56	46.45	126.55	**146.52**
03	1.50	12.37	2.00	24.58	139.92	180.37	**181.87**
04	765.61	53.88	23.20	39.02	10.39	892.09	**1021.21**
05	16.35	2.35	5.78	0.11	17.33	41.92	**165.77**
06	10.54	9.19	6.01	1.50	9.85	37.09	**54.93**
07	7.51	6.90	369.66	0.00	6.13	390.21	**405.16**
08	1.54	5.87	2.24	0.06	9.50	19.21	**39.42**
09	62.40	8.14	14.70	11.48	29.22	125.94	**269.18**
10	5.17	3.43	5.70	2.06	10.57	26.94	**58.77**
11	43.20	4.92	-0.64	0.92	13.69	62.10	**77.69**
12	21.80	38.26	11.18	9.56	2.58	83.37	**98.77**
13	152.55	8.27	6.40	3.37	17.03	187.62	**230.57**
14	36.43	4.85	1.04	1.00	14.58	57.90	**87.96**
Total	**1316.70**	**264.72**	**539.05**	**185.58**	**357.01**	**2663.06**	**3921.0**

Note: 1, 2....14 shows the economic sector classification in I-O table and Lao PDR national accounts. (See Appendix 3 for details).
Currency: Million US$ on producer's prices

TDI = Total Domestic Inputs
TGI = Total Gross Inputs
TII = Total Intermediate Inputs
CE = Compensation on Employees
PTX-S = Production Tax Less Subsidies
DEP = Depreciation
OS = Operating Surplus

HEC = Household Consumption Expenditures
GEC = Government Consumption Expenditures
GFCF = Gross Fixed Capital Formation
CI = Change in Inventories
E = Exports
M = Imports
TFD = Total Final Demand

Appendix 5

Fourteen Sectors 2008 Lao PDR Input Output Table

Sector Number		Intermediate Demand														TID
		01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	
Intermediate Inputs	**01**	100.85	19.56	12.54	266.30	5.71	6.17	0.54	0.00	0.00	0.26	0.92	16.29	7.21	18.81	455.1
	02	1.04	20.32	0.00	0.03	41.93	32.92	0.01	0.00	0.00	0.00	0.00	0.00	0.92	10.82	107.9
	03	0.00	0.00	0.00	0.00	45.79	0.00	68.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114.2
	04	69.12	11.97	3.57	1.75	0.00	0.00	0.51	7.11	26.59	0.00	0.00	0.00	0.97	10.19	131.7
	05	82.83	0.00	6.48	2.32	0.00	0.00	0.00	8.52	0.00	6.24	0.00	4.73	2.37	7.98	121.4
	06	3.14	0.34	23.19	0.39	1.79	1.54	0.12	0.83	36.25	0.63	1.89	2.76	2.19	3.14	78.2
	07	8.89	0.00	0.00	0.95	0.42	20.58	0.30	2.20	1.38	14.09	0.00	10.40	11.66	10.53	81.4
	08	1.83	9.69	6.78	0.67	4.77	4.67	0.48	11.42	11.96	8.57	10.24	6.52	1.84	1.31	80.7
	09	36.31	4.07	54.33	17.70	18.54	3.94	11.13	2.96	65.61	12.85	26.72	8.06	21.10	21.00	304.3
	10	4.37	12.39	8.38	3.26	2.25	0.71	1.25	2.30	78.09	10.56	0.75	18.31	1.49	5.96	150.0
	11	1.74	9.69	0.00	0.00	0.02	0.00	0.00	11.13	0.29	6.20	16.10	4.14	1.37	4.66	55.3
	12	0.00	2.40	0.00	3.87	7.16	7.35	3.99	4.26	4.69	0.00	0.00	5.24	2.44	3.47	44.8
	13	4.81	16.97	4.15	1.00	2.99	5.96	1.38	23.00	9.66	3.84	7.05	10.56	1.13	6.65	49.8
	14	7.53	7.17	1.48	0.18	1.24	2.43	1.60	9.83	3.72	1.20	2.56	8.55	0.41	1.96	99.1
	TDI	**322.45**	**114.56**	**120.91**	**298.44**	**132.62**	**86.29**	**89.79**	**83.57**	**238.25**	**64.45**	**66.22**	**95.56**	**55.09**	**106.50**	**1874.7**
	M	**227.15**	**89.36**	**52.00**	**206.96**	**163.17**	**25.37**	**201.93**	**151.03**	**245.23**	**129.97**	**73.20**	**90.21**	**93.89**	**119.76**	**1869.2**
	TII	549.61	203.91	172.91	505.39	295.78	111.65	291.72	234.60	483.48	194.42	139.42	185.78	148.98	226.26	3743.9
Value Added	**CE**	289.15	79.81	41.50	87.69	23.65	9.34	45.74	10.20	60.29	12.36	20.03	46.04	41.15	7.74	774.6
	PTX-S	25.87	12.30	9.83	12.64	9.13	7.39	15.09	7.98	20.75	7.27	10.16	7.27	9.75	7.74	163.1
	DEP	47.66	10.39	19.59	30.26	9.23	5.50	12.95	5.04	9.70	3.92	10.23	3.00	10.88	4.55	182.9
	OS	285.36	169.12	174.72	15.89	103.76	67.77	3.16	23.99	184.62	71.14	59.39	105.09	14.45	12.90	1291.3
	MTX	18.42	11.12	6.55	17.55	18.19	2.62	22.38	18.03	27.65	16.29	9.35	4.89	9.03	16.72	198.8
	TPI	**666.46**	**282.75**	**252.18**	**164.04**	**163.96**	**92.62**	**99.31**	**65.23**	**303.01**	**110.98**	**109.17**	**166.28**	**85.26**	**49.64**	**2610.8**
TGI		**1216.07**	**486.66**	**425.09**	**669.43**	**459.74**	**204.27**	**391.04**	**299.83**	**786.49**	**305.40**	**248.59**	**352.06**	**234.24**	**275.90**	**6354.8**

SN	Final Demand					TFD	TGO
	HCE	GCE	GFCF	CI	E		
01	292.69	78.56	164.10	131.49	94.07	760.92	**1216.07**
02	96.80	47.14	66.32	49.91	118.51	378.68	**486.66**
03	9.98	9.38	9.36	6.13	275.97	310.83	**425.09**
04	254.06	26.18	113.69	57.30	86.44	537.66	**669.43**
05	136.88	29.61	34.14	40.69	96.95	338.27	**459.74**
06	15.23	0.91	15.66	6.42	87.84	126.06	**204.27**
07	146.42	22.51	50.49	30.72	59.49	309.64	**391.04**
08	55.15	37.01	47.18	48.51	31.20	219.05	**299.83**
09	207.96	31.84	114.49	95.81	32.06	482.16	**786.49**
10	39.45	35.11	31.05	23.63	26.08	155.32	**305.40**
11	62.67	29.32	34.66	24.50	42.09	193.24	**248.59**
12	135.17	42.21	63.98	45.43	20.38	307.18	**352.06**
13	60.50	27.31	29.84	23.89	42.82	184.36	**234.24**
14	86.22	8.53	32.80	19.28	29.92	176.74	**275.90**
Total	**1599.19**	**425.62**	**807.75**	**603.71**	**1043.82**	**4480.11**	**6354.82**

Note: 1, 2....14 shows the economic sector classification in I-O table and Lao PDR national accounts. (See Appendix 3 for details).
Currency: Million US$ on producer's prices

TDI = Total Domestic Inputs
TGI = Total Gross Inputs
TII = Total Intermediate Inputs
CE = Compensation on Employees
PTX-S = Production Tax Less Subsidies
DEP = Depreciation
OS = Operating Surplus
SN = Sector Number

HEC = Household Consumption Expenditures
GEC = Government Consumption Expenditures
GFCF = Gross Fixed Capital Formation
CI = Change in Inventories
E = Exports
M = Imports
TFD = Total Final Demand

Appendix 6

Leontief's Coefficients (I-A) of the 2003 Lao PDR Input Output Table

SN	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	0.0410	0.0104	0.0081	0.5792	0.0131	0.0182	0.0025	-	-	0.0004	0.0009	0.0196	0.0348	0.0143
02	0.0003	0.0085	-	0.0001	0.0751	0.0758	0.0000	-	-	-	-	-	0.0156	0.0014
03	-	-	-	-	0.0011	-	0.0033	-	-	-	-	-	-	-
04	0.0884	0.0201	0.0073	0.0120	-	-	0.0074	0.0375	0.0217	-	-	-	0.0592	0.0060
05	0.0898	-	0.0112	0.0134	-	-	-	0.0381	-	0.0255	-	0.0152	0.0393	0.0125
06	0.0021	0.0003	0.0249	0.0014	0.0068	0.0075	0.0009	0.0023	0.0155	0.0016	0.0029	0.0055	0.0096	0.0072
07	0.0027	-	-	0.0016	0.0007	0.0457	0.0010	0.0028	0.0003	0.0163	-	0.0094	0.0146	0.0174
08	0.0012	0.0085	0.0072	0.0024	0.0180	0.0227	0.0037	0.0314	0.0051	0.0216	0.0158	0.0129	0.0040	0.0060
09	0.0188	0.0028	0.0450	0.0491	0.0542	0.0148	0.0652	0.0063	0.0217	0.0251	0.0321	0.0124	0.0495	0.0534
10	0.0023	0.0085	0.0070	0.0091	0.0066	0.0027	0.0074	0.0049	0.0259	0.0207	0.0009	0.0282	0.0141	0.0038
11	0.0019	0.0136	-	-	0.0001	-	-	0.0492	0.0002	0.0251	0.0400	0.0132	0.0227	0.0072
12	0.0002	0.0120	0.0015	0.0004	0.0092	0.0270	0.0013	0.0250	0.0002	0.0256	0.0188	0.0254	0.0006	0.0114
13	0.0119	0.0149	0.0037	0.0016	0.0111	0.0280	0.0287	0.0641	0.0038	0.0072	0.0094	0.0400	0.0141	0.0032
14	0.0035	0.0162	0.0048	0.0039	0.0123	0.0316	0.0114	0.0691	0.0045	0.0106	0.0119	0.0228	0.0221	0.0040
CE	0.2342	0.3502	0.1166	0.0924	0.1154	0.1583	0.1712	0.1443	0.2201	0.1073	0.1491	0.4652	0.0891	0.1545
PTX-S	0.0112	0.0359	0.0287	0.0065	0.0185	0.0234	0.0363	0.0429	0.0542	-	0.0347	0.0192	0.0291	0.0156
DEP	0.0495	0.0606	0.1219	0.0386	0.0494	0.0611	0.0800	0.0206	0.0348	0.0234	0.1341	0.0192	0.0366	0.0442
OS	0.3188	0.1913	0.1050	0.1402	0.2407	0.2041	0.1910	0.1065	0.3433	0.4534	0.3505	0.0693	0.1590	0.2023
MTX	0.0080	0.0215	0.0486	0.0041	0.0400	0.0194	0.0363	0.0292	0.0267	0.0222	0.0189	0.0184	0.0372	0.0379
M	0.1143	0.2245	0.4584	0.0442	0.3276	0.2597	0.3524	0.3257	0.2222	0.2140	0.1799	0.2039	0.3490	0.3977

Note: 1, 2....14 shows the economic sector classification in I-O table and Lao PDR national accounts. (See Appendix 3 for details).

CE = Compensation of Employees PTX-S = Production Tax and Subsidies DEP = Depreciation

OS = Operating Surplus MTX = Import Tax M = Imports

SN = Sector Number

Appendix 7

Leontief's Coefficients (I-A) of the 2008 Lao PDR Input Output Table

S.N.	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	0.0829	0.0402	0.0295	0.3978	0.0124	0.0302	0.0014	-	-	0.0008	0.0037	0.0463	0.0682	0.0308
02	0.0009	0.0417	-	0.0000	0.0912	0.1612	0.0000	-	-	-	-	-	0.0392	0.0039
03	-	-	-	-	0.0996	-	0.1751	-	-	-	-	-	-	-
04	0.0568	0.0246	0.0084	0.0026	-	-	0.0013	0.0237	0.0338	-	-	-	0.0369	0.0041
05	0.0681	-	0.0152	0.0035	-	-	-	0.0284	-	0.0204	-	0.0134	0.0289	0.0101
06	0.0026	0.0007	0.0546	0.0006	0.0039	0.0076	0.0003	0.0028	0.0461	0.0021	0.0076	0.0078	0.0114	0.0093
07	0.0073	-	-	0.0014	0.0009	0.1008	0.0008	0.0073	0.0018	0.0461	-	0.0295	0.0382	0.0498
08	0.0015	0.0199	0.0160	0.0010	0.0104	0.0229	0.0012	0.0381	0.0152	0.0281	0.0412	0.0185	0.0048	0.0079
09	0.0299	0.0084	0.1278	0.0264	0.0403	0.0193	0.0285	0.0099	0.0834	0.0421	0.1075	0.0229	0.0761	0.0901
10	0.0036	0.0255	0.0197	0.0049	0.0049	0.0035	0.0032	0.0077	0.0993	0.0346	0.0030	0.0520	0.0216	0.0064
11	0.0014	0.0199	-	-	0.0000	-	-	0.0371	0.0004	0.0203	0.0648	0.0118	0.0169	0.0058
12	-	0.0049	-	0.0058	0.0156	0.0360	0.0102	0.0142	0.0060	-	-	0.0149	0.0126	0.0104
13	0.0062	0.0147	0.0035	0.0003	0.0027	0.0119	0.0041	0.0328	0.0047	0.0039	0.0103	0.0243	0.0071	0.0017
14	0.0040	0.0349	0.0098	0.0015	0.0065	0.0292	0.0035	0.0767	0.0123	0.0126	0.0284	0.0300	0.0241	0.0048
CE	0.2378	0.1640	0.0976	0.1310	0.0514	0.0457	0.1170	0.0340	0.0767	0.0405	0.0806	0.1308	0.0280	0.1757
PTX-S	0.0213	0.0253	0.0231	0.0189	0.0199	0.0362	0.0386	0.0266	0.0264	0.0238	0.0409	0.0206	0.0280	0.0416
DEP	0.0392	0.0214	0.0461	0.0452	0.0201	0.0269	0.0331	0.0168	0.0123	0.0128	0.0411	0.0085	0.0165	0.0465
OS	0.2347	0.3475	0.4110	0.0237	0.2257	0.3317	0.0081	0.0800	0.2347	0.2329	0.2389	0.2985	0.0467	0.0617
MTX	0.0152	0.0229	0.0154	0.0262	0.0396	0.0128	0.0572	0.0601	0.0352	0.0534	0.0376	0.0139	0.0606	0.0385
M	0.1868	0.1836	0.1223	0.3092	0.3549	0.1242	0.5164	0.5037	0.3118	0.4256	0.2945	0.2562	0.4341	0.4008

Note: 1, 2....14 shows the economic sector classification in I-O table and Lao PDR national accounts. (See Appendix 3 for details).
CE = Compensation of Employees PTX-S = Production Tax and Subsidies DEP = Depreciation
OS = Operating Surplus MTX = Import Tax M = Imports
S.N. = Sector Number

Appendix 8

Leontief Inverse or Social Accounting Matrix $(I-A)^{-1}$ of the 2003 Lao PDR Input Output Table

S.N.	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.1055	0.0272	0.0162	0.6497	0.0197	0.0278	0.0104	0.0343	0.0156	0.0042	0.0039	0.0265	0.0817	0.0222
02	0.0085	1.0093	0.0032	0.0064	0.0769	0.0783	0.0007	0.0053	0.0016	0.0026	0.0007	0.0026	0.0209	0.0034
03	0.0001	0.0000	1.0000	0.0001	0.0011	0.0002	0.0033	0.0001	0.0000	0.0001	0.0000	0.0001	0.0001	0.0001
04	0.1005	0.0247	0.0108	1.0728	0.0065	0.0084	0.0111	0.0480	0.0246	0.0032	0.0028	0.0054	0.0711	0.0103
05	0.1014	0.0046	0.0138	0.0739	1.0039	0.0061	0.0025	0.0477	0.0030	0.0286	0.0022	0.0211	0.0497	0.0156
06	0.0039	0.0010	0.0262	0.0048	0.0083	1.0090	0.0025	0.0048	0.0163	0.0029	0.0041	0.0070	0.0118	0.0086
07	0.0039	0.0011	0.0017	0.0043	0.0020	0.0479	1.0021	0.0061	0.0018	0.0176	0.0009	0.0118	0.0166	0.0184
08	0.0042	0.0100	0.0090	0.0059	0.0205	0.0258	0.0048	1.0361	0.0067	0.0247	0.0179	0.0159	0.0073	0.0077
09	0.0337	0.0078	0.0492	0.0724	0.0592	0.0247	0.0705	0.0231	1.0257	0.0322	0.0365	0.0211	0.0635	0.0590
10	0.0054	0.0101	0.0090	0.0142	0.0099	0.0063	0.0100	0.0091	0.0277	1.0237	0.0030	0.0312	0.0182	0.0064
11	0.0029	0.0159	0.0010	0.0024	0.0032	0.0042	0.0011	0.0562	0.0015	0.0289	1.0434	0.0168	0.0258	0.0085
12	0.0020	0.0136	0.0030	0.0022	0.0117	0.0304	0.0023	0.0295	0.0017	0.0286	0.0210	1.0286	0.0031	0.0127
13	0.0066	0.0185	0.0072	0.0089	0.0165	0.0376	0.0129	0.0763	0.0063	0.0148	0.0149	0.0267	1.0261	0.0063
14	0.0155	0.0172	0.0060	0.0116	0.0152	0.0349	0.0300	0.0709	0.0055	0.0117	0.0124	0.0443	0.0185	1.0059

Note: S.N. = Sector Number, 1, 2....14 shows the economic sector classification in Input Output table and Lao PDR national accounts. (See Appendix 3 for details).

Appendix 9

Leontief Inverse or Social Accounting Matrix $(I-A)^{-1}$ of the 2008 Lao PDR Input Output Table

S.N.	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.1221	0.0644	0.0446	0.4488	0.0273	0.0525	0.0118	0.0234	0.0222	0.0056	0.0121	0.0594	0.1031	0.0415
02	0.0097	1.0466	0.0133	0.0048	0.0985	0.1727	0.0030	0.0082	0.0102	0.0041	0.0046	0.0056	0.0491	0.0085
03	0.0095	0.0016	1.0038	0.0046	0.1010	0.0195	0.1763	0.0061	0.0031	0.0111	0.0013	0.0087	0.0118	0.0109
04	0.0662	0.0325	0.0176	1.0303	0.0080	0.0113	0.0060	0.0309	0.0403	0.0040	0.0080	0.0071	0.0492	0.0112
05	0.0775	0.0074	0.0204	0.0349	1.0050	0.0071	0.0044	0.0349	0.0055	0.0235	0.0039	0.0211	0.0386	0.0144
06	0.0062	0.0032	0.0628	0.0046	0.0131	1.0120	0.0131	0.0069	0.0523	0.0062	0.0153	0.0117	0.0182	0.0156
07	0.0103	0.0052	0.0100	0.0066	0.0049	0.1072	1.0039	0.0150	0.0144	0.0503	0.0053	0.0375	0.0451	0.0539
08	0.0045	0.0249	0.0225	0.0039	0.0171	0.0308	0.0064	1.0444	0.0230	0.0333	0.0495	0.0241	0.0115	0.0122
09	0.0460	0.0234	0.1490	0.0487	0.0645	0.0394	0.0592	0.0330	1.1040	0.0580	0.1333	0.0418	0.1019	0.1076
10	0.0105	0.0322	0.0377	0.0129	0.0181	0.0168	0.0141	0.0158	0.1156	1.0434	0.0189	0.0612	0.0373	0.0197
11	0.0026	0.0250	0.0025	0.0015	0.0038	0.0067	0.0010	0.0440	0.0046	0.0245	1.0726	0.0161	0.0214	0.0078
12	0.0025	0.0069	0.0044	0.0073	0.0179	0.0405	0.0116	0.0179	0.0098	0.0023	0.0029	1.0177	0.0164	0.0130
13	0.0071	0.0416	0.0172	0.0054	0.0148	0.0420	0.0078	0.0857	0.0199	0.0184	0.0379	0.0363	1.0319	0.0095
14	0.0080	0.0177	0.0067	0.0040	0.0064	0.0181	0.0059	0.0366	0.0079	0.0064	0.0141	0.0272	0.0109	1.0041

Note: S.N. = Sector Number, 1, 2....14 shows the economic sector classification in Input Output table and Lao PDR national accounts. (See Appendix 3 for details).

Appendix 10

Constructing and Balancing the 2008 Lao PDR I-O Table (unbalanced 2008 Lao PDR I-O Table)

Economic sectors		Intermediate Demand														TID	E	TFD	TGO
		01	02	03	04	05	06	07	08	09	10	11	12	13	14				
Intermediate Inputs	01															455.1	94.0	760.9	1216.0
	02															107.9	118.5	378.6	486.6
	03															114.2	275.9	310.8	425.0
	04															131.7	86.4	537.6	669.4
	05															121.4	96.9	338.2	459.7
	06															78.2	87.8	126.0	204.2
	07															81.4	59.4	309.6	391.0
	08															80.7	31.2	219.0	299.8
	09															304.3	32.0	482.1	786.4
	10															150.0	26.0	155.3	305.4
	11															55.3	42.0	193.2	248.5
	12															44.8	20.3	307.1	352.0
	13															49.8	42.8	184.3	234.2
	14															99.1	29.9	176.7	275.9
	TDI	322.4	114.5	120.9	298.4	132.6	86.2	89.7	83.5	238.2	64.4	66.2	95.5	55.0	106.5	1874.7	1043	4480.1	**6354.8**
	M	227.1	89.3	52.0	206.9	163.1	25.3	201.9	151.0	245.2	129.9	73.2	90.2	93.8	119.7	1869.2			
	TII																		
Value Added	CE																		
	PTX-S																		
	DEP																		
	OS																		
	MTX																		
	TPI	666.4	282.7	252.1	164.0	163.9	92.6	99.3	65.2	303.0	110.9	109.1	166.2	85.2	49.6	2610.8			
TGI		1216.0	486.6	425.0	669.4	459.7	204.2	391.0	299.8	786.4	305.4	248.5	352.0	234.2	275.9	**6354.8**			

Note: The 2003 IO coefficients applied to year 2008 outputs (A_0*X_1) and calculation of the first set of row multipliers (R_1).
Adjustment of matrix along rows based on the first set of row multipliers (R_1) and calculations of the first set of column multipliers (S_1) and so on.
We have, V* and V_1 where, $S_1 = V^*/V_1$ and again we have, U_2 and U*, where, $R_2 = U^*/U_2$ and repeat the iterations until the total input equals to total output.

Appendix 11

Data Entry of the 2003 and 2008 Lao PDR I-O Tables in the SimSIP SAM Software

Entity	Number of components
Endogenous accounts	
Activities	14
Commodities	14
Labour	1
Capital	1
Land	1
Enterprises	1
Households	1
Exogenous accounts	
Government	6
Capital account	1
Rest of the world	1
Residual	1

DO NOT DELETE ROWS OR COLUMNS FROM THIS SHEET!!

Type the labels for entities and the number of components.

The matrix will be generated respecting the order in which the entities are typed.

You can eliminate an entity by typing the number 0 in the components column.

Done typing, use this design

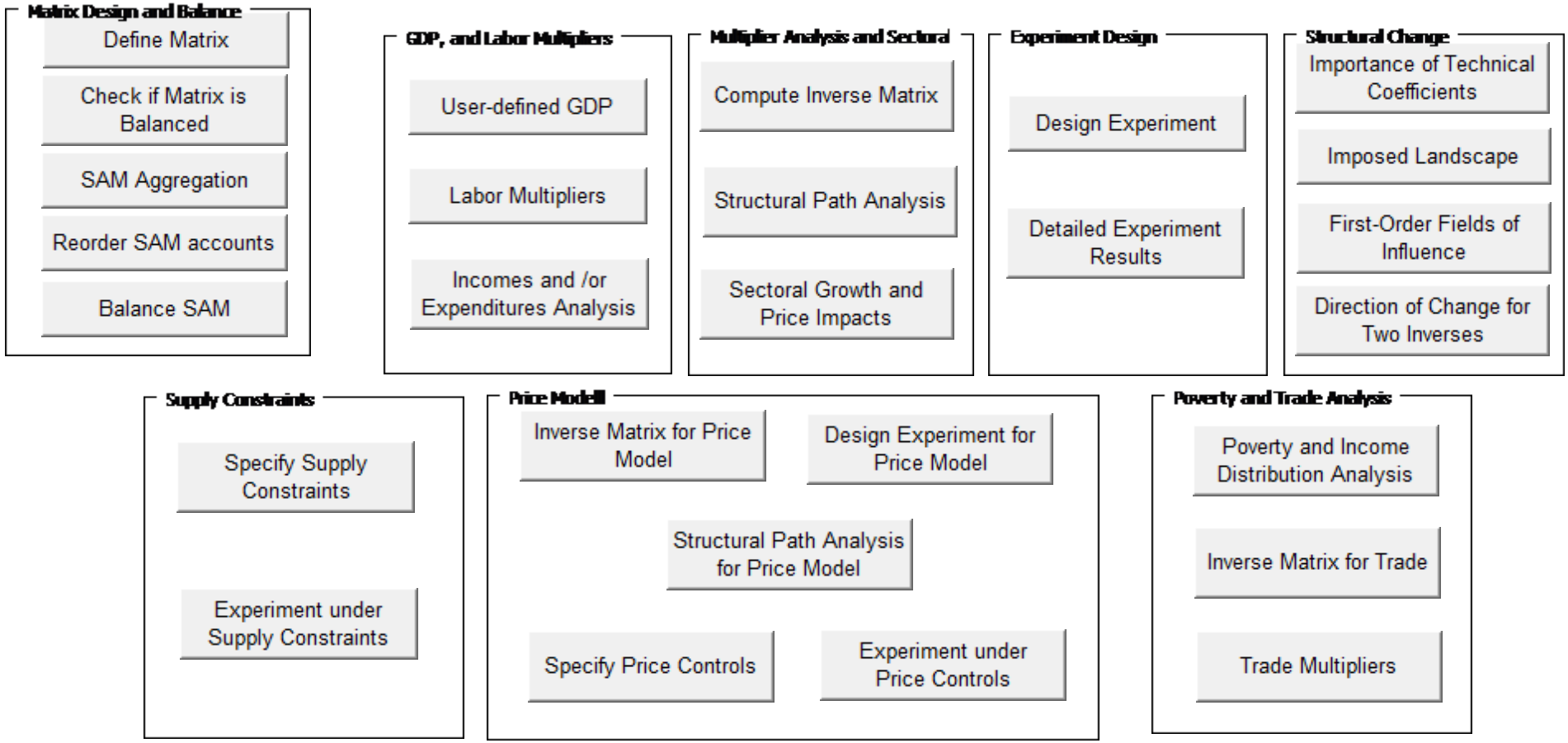
Back to Main Page

Appendix 12

Data Simulation of the 2003 and 2008 Lao PDR I-O Tables in the SimSIP SAM Software

Country Lao PDR
Year 2003/2008

Currency US$
Units Million



Appendix 13

Values of the 2003 Lao PDR Input Output Multiplier Product Matrix

		4	8	**14**	1	6	12	5	10	13	7	11	2	3	9
		FOODBEV	TRANCOM	**TOURISM**	AGRILIV	ELECWAT	PUBADM	ALLMAN	BANKFIN	PERSERV	CONSTRU	REALBUS	FORESLO	MINEQYA	W&RTRA
1	AGRILIV	0.2164	0.1623	**0.1586**	0.1564	0.1504	0.1412	0.1407	0.1372	0.1329	0.1306	0.1305	0.1302	0.1297	0.1276
9	W&RTRAD	0.1671	0.1253	**0.1225**	0.1207	0.1161	0.1090	0.1086	0.1060	0.1026	0.1008	0.1008	0.1005	0.1001	0.0985
4	FOODBEV	0.1482	0.1112	**0.1086**	0.1071	0.1030	0.0967	0.0964	0.0940	0.0910	0.0894	0.0894	0.0892	0.0888	0.0874
5	ALLMAN	0.1454	0.1091	**0.1066**	0.1051	0.1011	0.0949	0.0946	0.0922	0.0893	0.0877	0.0877	0.0875	0.0871	0.0858
13	PERSERV	0.1375	0.1032	**0.1008**	0.0994	0.0956	0.0897	0.0894	0.0872	0.0845	0.0830	0.0830	0.0827	0.0824	0.0811
14	**TOURISM**	**0.1354**	**0.1016**	**0.0993**	**0.0979**	**0.0942**	**0.0884**	**0.0881**	**0.0859**	**0.0832**	**0.0817**	**0.0817**	**0.0815**	**0.0811**	**0.0799**
2	FORESLO	0.1291	0.0969	**0.0947**	0.0933	0.0898	0.0843	0.0840	0.0819	0.0793	0.0779	0.0779	0.0777	0.0774	0.0762
11	REALBUS	0.1283	0.0962	**0.0940**	0.0927	0.0892	0.0837	0.0834	0.0814	0.0788	0.0774	0.0774	0.0772	0.0769	0.0757
8	TRANCOM	0.1266	0.0950	**0.0928**	0.0915	0.0880	0.0826	0.0823	0.0803	0.0778	0.0764	0.0764	0.0762	0.0759	0.0747
12	PUBADMI	0.1260	0.0945	**0.0924**	0.0910	0.0876	0.0822	0.0819	0.0799	0.0774	0.0760	0.0760	0.0758	0.0755	0.0743
10	BANKFIN	0.1253	0.0940	**0.0919**	0.0905	0.0871	0.0818	0.0815	0.0795	0.0770	0.0756	0.0756	0.0754	0.0751	0.0739
7	CONSTRU	0.1202	0.0902	**0.0881**	0.0869	0.0836	0.0785	0.0782	0.0763	0.0738	0.0725	0.0725	0.0723	0.0721	0.0709
6	ELECWAT	0.1176	0.0882	**0.0862**	0.0850	0.0818	0.0767	0.0765	0.0746	0.0722	0.0709	0.0709	0.0708	0.0705	0.0694
3	MINEQYA	0.1064	0.0798	**0.0780**	0.0769	0.0740	0.0694	0.0692	0.0675	0.0653	0.0642	0.0642	0.0640	0.0637	0.0627

Note: 1, 2, ...14 shows the economic sectors of the Lao PDR economy.
Values in column show the hierarchies of backward linkages while the values in row show the hierarchies of forward linkages.

Appendix 14

Values of the 2008 Lao PDR Input Output Multiplier Product Matrix

		4	6	**14**	9	3	8	5	1	11	12	2	13	7	10
		FOODBEV	ELECWAT	**TOURISM**	W&RTRA	MINEQYA	TRANCOM	ALLMAN	AGRILIVE	REALBUS	PUBADM	FORESLO	PERSERV	CONSTRU	BANKFIN
1	AGRILIVE	0.2559	0.2423	**0.2366**	0.2117	0.2093	0.2068	0.2016	0.1979	0.1972	0.1941	0.1918	0.1845	0.1834	0.1765
9	W&RTRA	0.2493	0.2360	**0.2305**	0.2062	0.2038	0.2014	0.1963	0.1928	0.1921	0.1891	0.1868	0.1797	0.1787	0.1719
10	BANKFIN	0.1664	0.1575	**0.1539**	0.1377	0.1361	0.1345	0.1311	0.1287	0.1282	0.1262	0.1247	0.1200	0.1193	0.1148
2	FORESLO	0.1632	0.1545	**0.1509**	0.1350	0.1335	0.1319	0.1285	0.1262	0.1258	0.1238	0.1223	0.1176	0.1170	0.1125
14	**TOURISM**	**0.1522**	**0.1440**	**0.1407**	**0.1259**	**0.1244**	**0.1229**	**0.1198**	**0.1177**	**0.1172**	**0.1154**	**0.1140**	**0.1097**	**0.1091**	**0.1049**
7	CONSTRU	0.1510	0.1430	0.1396	0.1249	0.1235	0.1220	0.1189	0.1168	0.1164	0.1146	0.1132	0.1089	0.1082	0.1041
3	MINEQYA	0.1470	0.1391	**0.1359**	0.1216	0.1202	0.1187	0.1157	0.1137	0.1132	0.1115	0.1101	0.1059	0.1053	0.1013
4	FOODBEV	0.1430	0.1354	**0.1322**	0.1183	0.1169	0.1155	0.1126	0.1106	0.1102	0.1085	0.1072	0.1031	0.1025	0.0986
8	TRANCOM	0.1396	0.1321	**0.1290**	0.1155	0.1141	0.1127	0.1099	0.1079	0.1075	0.1059	0.1046	0.1006	0.1000	0.0962
5	ALLMAN	0.1388	0.1314	**0.1283**	0.1148	0.1135	0.1121	0.1093	0.1073	0.1069	0.1053	0.1040	0.1000	0.0995	0.0957
6	ELECWAT	0.1285	0.1216	**0.1188**	0.1063	0.1051	0.1038	0.1012	0.0994	0.0990	0.0975	0.0963	0.0926	0.0921	0.0886
11	REALBUS	0.1278	0.1210	**0.1182**	0.1057	0.1045	0.1033	0.1007	0.0989	0.0985	0.0970	0.0958	0.0921	0.0916	0.0881
13	PERSERV	0.1175	0.1112	**0.1087**	0.0972	0.0961	0.0949	0.0925	0.0909	0.0905	0.0891	0.0881	0.0847	0.0842	0.0810
12	PUBADM	0.1164	0.1101	**0.1076**	0.0963	0.0951	0.0940	0.0916	0.0900	0.0897	0.0883	0.0872	0.0839	0.0834	0.0802

Note: 1, 2, ...14 shows the economic sectors of the Lao PDR economy.
Values in column show the hierarchies of backward linkages while the values in row show the hierarchies of forward linkages

Appendix 15

Lincoln University Human Ethics Committee's Approval Letter

Research & Commercialisation Office
P O Box 94
Lincoln University
Canterbury 8150
NEW ZEALAND
Telephone 64 03 325 2811
Fax 64 03 325 3630

Application No: 2009-43 10 November 2009

Title: An Economic Analysis of the Lao PDR Tourism Industry

Applicants: Bhoj Raj Khanal

The Lincoln University Human Ethics Committee has reviewed the above noted application.

Dear Bhoj Raj

Thank you for your detailed response to the questions which were forwarded to you on the Committee's behalf.

The project is approved subject to undertaking the followings:

1. Research Information Sheets (RISs)

   (a) As requested, please remove the pro-forma or template headings from the RISs. You have indicated that you have done this, but you have not.

   (b) The RISs are still written in a mixture of "third" person (spoken of) and "first" person (spoken to). Please review this again to ensure consistency.

2. Letters

   (a) Second paragraph, first sentence. Change to "This research survey/interview is voluntary in nature...and you are free to decide not to participate and to withdraw...survey/interview".

   (b) Second paragraph, second sentence. Delete the sentence "Your participation...success of this research".

(c) Third paragraph, second sentence. Re-write "The completed...in this research".

(d) Last paragraph. Change The Human Ethics Committee of Lincoln University to the Lincoln University Human Ethics Committee.

3. Please ensure that you work closely with your Supervisors in implementing these changes.

I am pleased to give final approval to your project and may I, on behalf of the Committee, wish you success in your research.

Yours sincerely

Professor Grant Cushman
Chair, Human Ethics Committee

PLEASE NOTE: The Human Ethics Committee has an audit process in place for applications. Please see 7.3 of the Human Ethics Committee Operating Procedures (ACHE) in the Lincoln University Policies and Procedures Manual for more information.

cc: Assoc Prof Dr Christopher Gan (Commerce)
Assoc Prof Dr Susanne Becken (ESD)

Appendix 16

Research Information Sheet and Consent Form

Lincoln University

Faculty: Commerce

You are invited to participate as a subject in a project titled "**An Economic Analysis of the Lao PDR Tourism Industry".**

The aim of this research is to investigate the economic impacts of tourism including impacts assessment on indirect and induced effects of tourism on the other economic sectors of Lao PDR following the development of the Greater Mekong Subregion economic corridors.

The researcher will approach international visitors and provides details of the project and its purpose. Then the researcher will explain to the visitors that participation in the survey is completely voluntary in nature and participants can withdraw anytime during survey.

International visitors departing from Lao PDR are the target for this visitors' expenditure survey.

The survey will take about 20 minutes to complete.

The results of the project may be published; you may be assured of the complete confidentiality of data gathered in this investigation: the identity of participants will not be made public without their consents. To ensure anonymity and confidentiality the following steps will be taken:

- The participation in the survey is voluntary in nature.
- The survey questionnaire does not include the name and address of the participants.
- Anonymity will be maintained throughout the research process.
- The survey includes only the age range, nationality and country of residence of the participants.
- The data collected from visitors' expenditure survey will be aggregated to estimate the impacts of tourism in Lao PDR and personal identification of the participants will be discarded.

This will maintain the confidentiality of the participants.

Only the researcher and supervisors can assess the participants' responses in the questionnaire.

The participants are free to terminate the participation at any time during survey and without prejudice, including withdrawal of any information the participants have provided.

However, if the participants complete the questionnaire and give it back to the researcher or research assistant, it will be understood that the participants are 18 years of age or older and

have consented to participate in this survey and consent to publication of the results of this research with the understanding the anonymity will be preserved.

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Signature of the Participant Date

Name of principal researcher: **Bhoj Raj Khanal, Ph.D. Student**

Contact details: **Faculty of Commerce, Lincoln University**
Lincoln 7647, Canterbury, New Zealand
Phone: 64(0)3-420-1140, Mobile : 64-21-072-3164
Email: Bhoj.Khanal@lincolnuni.ac.nz

The researcher will be pleased to discuss any concerns you have about participation in the project.

Name of Supervisors

Dr Christopher Gan, and Dr Susanne Becken

Contact Details:

Supervisor
Dr Christopher Gan
Associate Professor,
Faculty of Commerce
Lincoln University
Tel: 64(0)3-325-2811 ext 8155
Email: Christopher.Gan@lincoln.ac.nz

Associate Supervisor
Dr Susanne Becken
Associate Professor, Faculty of
Environment Society and Design
Lincoln University
Tel: 64(0)3-325-3838 ext 8296
Email:Susanne.Becken@lincoln.ac.nz

The project has been reviewed and approved by Lincoln University Human Ethics Committee.

Appendix 17

International Tourists'/Visitors' Expenditure Survey

Instruction: *For each question with brackets provided, please tick your answer(s); otherwise, please follow the instructions given to answer the questions. This is voluntary survey and respondent can stop/quit at any time during survey. The information provided will be used for estimating the total tourism earnings of Lao PDR from international visitors. All information containing in the survey remain strictly confidential.*

Note: *Make sure that the respondent is the departing international tourist/visitor from Lao PDR before proceeding with the survey.*

Section 1: Visitor's/Tourists' Expenditure

1. What are your main reasons in visiting Lao PDR?
   a. Holiday/vacation [ ]
   b. Study/academic [ ]
   c. Conference/meeting [ ]
   d. Visit family and friends [ ]
   e. Business/commercial [ ]
   f. Transit [ ]
   g. Shopping [ ]
   h. Medical [ ]
   i. Other(s) please specify _____

2. Is this your first visit to Lao PDR?
   a. Yes [ ] b. No [ ] (please go to Q3)

3. If "No" in Q2, how many times have you visited Lao PDR including this trip?
   _____ (number of trips)

4. How did you arrive in Lao PDR?
   a. By plane [ ]
   b. By car [ ]
   c. By train [ ]
   d. By bus (including tour bus) [ ]
   e. Other(s) please specify _____

5. Who are you travelling on this trip? (you can tick more than one)
   a. Alone [ ]
   b. Spouse [ ]
   d. Children [ ]
   d. Relatives [ ]
   e. Friends/associates [ ]

6. Did you spend overnight in Lao PDR in this trip?
   a. No [ ]
   b. Yes [ ]

7. If "Yes" in Q6, how many nights did you spend in Lao PDR in this trip?
_____ Number of nights

8. If you visited Lao PDR for single day, what was the main purpose of this?
   a. I am in transit to/from other countries [ ]
   b. I am just visiting Lao PDR for academic meeting/conference [ ]
   c. Business purpose [ ]
   d. Others (please specify) _____

9. Below is a series of statement pertaining of your overall perception of Lao PDR tourism. Please circle the number, which most accurately reflects your opinion on a scale of 1 to 5, where "1" means "Very Poor" and "5" means "Very Good".

	Description	Very Poor	Poor	Satisfactory	Good	Very Good
i.	**At the border crossing**					
	a) Immigration	1	2	3	4	5
	b) Customs	1	2	3	4	5
	c) Visa processing	1	2	3	4	5
ii.	**At the accommodations**					
	a) Room	1	2	3	4	5
	b) Food	1	2	3	4	5
	c) Water/soft drinks	1	2	3	4	5
	d) Services	1	2	3	4	5
iii.	**General**					
	a) Scenery/excursion	1	2	3	4	5
	b) Shops	1	2	3	4	5
	c) Local transportation	1	2	3	4	5
	d) Entertainment	1	2	3	4	5
	e) People's attitudes	1	2	3	4	5

10. How was your Lao PDR's trip compared to your expectations?
    a. Far exceeded expectations [ ]
    b. Better than expected [ ]
    c. As expected [ ]
    d. Disappointing [ ]
    e. Very disappointing [ ]

11. Did you use package tour?
    a. Yes [ ] If "Yes" please go to Section 2
    b. No [ ] If "No" please go to Section 3

Section 2: Package Tour

1. Items included in package tour (you may tick more than one)
   a. International transport [ ]
   b. Accommodations [ ]
   c. Local transport [ ]
   d. Sightseeing/excursion [ ]

e. Food and beverage [ ]
f. Other(s) please specify _____

2. Total cost of the package tour per person
   i. Below US$100 [ ]
   ii. US$101- US$200 [ ]
   iii. US$201- US$300 [ ]
   iv. More than US$300 [ ]

3. What is the type of transportation included in this tour package?
   a. One way travel [ ]
   b. Round Trip [ ]

4. Does it include services such as?

a. Tour escort for entire trip	Yes	[ ]	No	[ ]
b. Commercial guided tours	Yes	[ ]	No	[ ]
c. Bicycles rental	Yes	[ ]	No	[ ]
d. Car rental	Yes	[ ]	No	[ ]

   e. Other(s) please specify _____

5. Please give breakdown of your expenditure in this trip in Lao PDR on the following (Please tick in the box wherever applicable for you)

Description of expenses	Up to US$25	US$ 25- 50	US$ 51- 75	US$ 75- 100	More than US$100
a. Food and beverages					
b. Shopping/retail trade					
c. Local transports					
d. Sightseeing					
e. Transportation in organized tour					
f. Entertainment and recreation					
g. Phone, internet and postage					
h. Visa fee					
i. Miscellaneous					

Section 3: Non-package Tour

1. What was the total amount you spent in Lao PDR?
   i. Up to US$100 [ ]
   ii. US$101- US$200 [ ]
   iii. US$201- US$300 [ ]
   iv. More than US$300 [ ]

2. Of that amount how much was spent on accommodations?
   i. Up to US$50 [ ]
   ii. US$51- US$100 [ ]
   iii. US$101- US$150 [ ]
   iv. More than US$150 [ ]

3. Please give breakdown of your expenditures during your visit in Lao PDR on the following: (Please tick in the box wherever applicable for you)

Description of expenses	Up to US$25	US$ 25- 50	US$ 51- 75	US$ 75- 100	More than US$100
a. Food and beverages					
b. Shopping/retail trade					
c. Local transports					
d. Sightseeing					
e. Transportation (include organized tour)					
f. Entertainment and recreation					
g. Phone, internet and postage					
h. Visa fee					
i. Miscellaneous					

4. How much did you pay for exit tax for leaving Lao PDR?
   a. None [ ]
   b. Up to US$5 [ ]
   c. US$6- US$10 [ ]
   d. More than US$10 [ ]

Section 4: Demographic and Socio Economic Characteristics of Respondents

1. What is your gender?
   a. Male [ ] b. Female [ ]

2. Which age group do you belong to?
   a. 18 – 30 years old [ ]
   b. 30 – 45 years old [ ]
   c. 45 – 60 years old [ ]
   d. Over 60 years old [ ]

3. What is your marital status?
   a. Single/Never married [ ]
   b. Married [ ]
   c. De facto relationship [ ]
   d. Divorced/separated [ ]

4. What is your main occupation?
   a. Farming [ ]
   b. Education/Research Professional [ ]
   c. Government Workers [ ]
   d. Businessperson [ ]
   e. Unemployed [ ]
   f. Student [ ]
   g. Retired [ ]
   h. Other(s) please specify _____

5. Sources of information those were influential in selecting Lao PDR as destination. (You can tick more than one if applicable)
   a. Mekong Tourism Organizations [ ]

b. Travel agents [ ]
c. National Tourism Board [ ]
d. Websites [ ]
e. Friends/relatives [ ]
f. Hotels/private sectors [ ]
g. Other(s) please specify _____

6. Could you please tell us your monthly income (personal)?
   a. Less than US$1,000 [ ]
   b. Between US$1,001 to US$2,000 [ ]
   c. Between US$2,001 to US$3,000 [ ]
   d. Between US$3,001 to US$4,000 [ ]
   e. More than US$4,000 [ ]

7. Which parts of Lao PDR you visited during this trip? (You can tick more than one)
   a. Vientiane [ ]
   b. Pakse [ ]
   c. Champasak [ ]
   d. Luang Prabhang [ ]
   e. Luang Namtha [ ]
   f. Savannakhet [ ]
   g. Other(s) please specify _____

8. What are your main interests/areas of visiting Lao PDR? (You can tick more than one)
   a. Cultural heritages [ ]
   b. City/urban areas [ ]
   c. National parks/protected areas [ ]
   d. Religious and sacred places [ ]
   e. Rural livelihood and ethnic minorities [ ]
   f. Casino [ ]
   g. Other(s) please specify _____

9. Could you please enlist the name of the countries that you have visited or plan to visit with this trip along with Lao PDR?
   a. _____ _____
   b. _____ _____
   c. _____ _____

10. Could you please tell us about your country of residence and nationality?
    _____ Residence _____ Nationality

Your participation in this survey is greatly appreciated. Thank you for your time and if you have further comments about the survey please feel free to comment in the space provided below.

Appendix 18

Lao PDR's Tourism Stakeholders' Survey/Interview

Hello, my name is Bhoj Raj Khanal and I am conducting an interview for my Ph. D. thesis study regarding the economic impacts of international tourism in Lao PDR. This is a voluntary survey. If you wish you can participate or you can stop/quit at any time during survey. This is a study project and information given in the interview will be confidential. This will take around 30 minutes.

Section 1: GMS Economic corridors and Regional Tourism

1. Do you agree or disagree that GMS economic corridors have benefited tourism in Lao PDR? Why and how?

2. What types of tourism related businesses do you see taking place along the Greater Mekong Subregion (GMS) Economic Corridors in Lao PDR (especially along the East West Economic Corridor-EWEC and North South Economic Corridor-NSEC)?

3. Do you think that Lao PDR is benefiting from the subregional tourism marketing with other GMS countries (such as Thailand, Vietnam, Myanmar, China and Cambodia)?

4. In your opinion, how important is it for the tourism-related businesses in the EWEC and NSEC economic corridors to work together to market the subregion?
   1. Important [ ]
   2. Not important [ ]
   3. No opinion [ ]

5. If the tourism cooperation of the GMS counties is to continue, in what form would you like this subregional cooperation to be in the future?

6. Could you please outline some of the issues about the GMS cross border facilitation along the Economic Corridors in order to ease the movement of tourists in Lao PDR?

7. Do you think the GMS single visa system is important or unimportant for tourism sector of Lao PDR? and why?

Section 2: Socio Economic Impacts

1. What can tourism do for the residents, communities, economy and environment of Lao PDR? List the specific benefits you believe tourism can bring to the country.

2. Where are the main tourism businesses growing because of the increase of number of international tourists in Lao PDR?

3. What do you think about the backward and forward linkages of tourism sector to the other economic sectors of Lao PDR?

4. Are there any multiplier effects of tourism sector to other economic sectors?

5. Could you please identify the major socio-economic impacts of tourism in Lao PDR?

6. Does the income of Lao PDR's tourism industry rely mostly on imported goods and employ foreign employees?

Section 3: Marketing and promotion

1. What are tourism initiative programmes currently supported by Lao PDR government to the national, provincial and local levels?

2. Do you think a single, identified brand ***"Laos: Simply Beautiful"***, for Lao PDR tourism is assisting tourist recognition? If not, why?

3. How regional tourism promotion brand name ***"Mekong Brand Tourism"*** has helped in the tourism sector promotion and development in Lao PDR?

4. Why do you think working together on marketing efforts at subregional level at Mekong is important/not important for Lao PDR?

5. What means of tourism promotion does Lao PDR use to promote the tourism (both from government and private sectors)? Which have been the most effective?

6. What marketing efforts have been initiated and developed by the Lao PDR government to promote tourism along the East West and North South Economic Corridors?

7. Different types of tourism appeal to different people and have different impacts on the areas in which they are located. Using a scale from 1 to 5, where "1" indicates that you are "Strongly Opposed" and "5" indicates that you are "Strongly in Favour," please tell me how much you favour or oppose Lao PDR government actively promoting the following types of tourism:

Description	Strongly opposed	Opposed	Indifferent	Favour	Strongly favour
Community based eco-tourism	1	2	3	4	5
Cultural or historic areas	1	2	3	4	5
Agro-tourism	1	2	3	4	5
Commercial attractions (golf, amusement parks, casino)	1	2	3	4	5
Religious/sacred sites	1	2	3	4	5
Other(s) please specify	1	2	3	4	5

7. What means of promotion does Lao PDR use to promote tourism in the country? (You can tick more than one)

1. Magazine(s) [ ]
2. Tourism road-show [ ]
3. Newspaper(s) [ ]
4. Chamber of commerce and private sectors [ ]
5. Radio/Television [ ]
6. Convention and visitors' bureau [ ]
7. National Tourism Authority [ ]
8. Mekong Tourism Organizations [ ]

9. Travel guide(s) / brochure(s) [ ]
10. Internet / web site(s) [ ]
11. Local visitor guide(s) [ ]
12. None [ ]
13. Other(s) please specify _____

Section 4: Management and Policy

1. Would you please tell us some attractive places for tourism in Lao PDR that you would take visitors from overseas?

2. If you have suggestions for growing tourism industry in your area, please share your ideas with us here.

3. In your opinion, who should make decisions in Lao PDR about tourism? Would you say that decisions about tourism are best left to the private sector (like private business leaders) or Lao PDR government?

4. What do you think what are the main constraints and shortcomings Lao PDR's tourism industry confront?

5. What are the primary issues to be considered in order to attract more tourists to develop the Lao PDR into one of the most popular tourist destination in the GMS?

Section 5: Stakeholders' perception

1. Below is a series of statements pertaining to your overall perceptions about the impacts of tourism in Lao PDR's economy after the construction of the GMS economic corridors. Using a scale from 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree," please tell me how much you agree or disagree with each statement.

Overall perceptions of tourism and tourism development on Lao PDR's economy after the GMS Economic Corridors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Increase tourism would help to increase investments from domestic and international investors	1	2	3	4	5
2. Tourism creates job opportunities for the people	1	2	3	4	5
3. Tourism promotion is good for the local economy	1	2	3	4	5
4. Tourism can help farmers and the agricultural industry gain additional revenues because of forward and backward linkages	1	2	3	4	5
5. Increased tourism would help local residents learn and preserve more about the country's history and culture	1	2	3	4	5
6. Increase tourism has helped to increase the number of tourism entrepreneurships along the economic corridors	1	2	3	4	5
7. Increased tourism would help to boost Lao PDR's economy	1	2	3	4	5

8. Bringing tourism to Lao PDR would help earn foreign currency	1	2	3	4	5
9. Tourism can provide an alternative sources of income for the people residing along the economic corridors	1	2	3	4	5
10. Tourism has increased the imports of tourism related goods from neighbouring countries	1	2	3	4	5
11. Tourism has increased exports of local products impacting tourism enterprises positively in Lao PDR's economy	1	2	3	4	5

2. Using a scale from 1 to 5, where "1" indicates that things in the Lao PDR would "Get Much Worse," "3" indicates that things "Would Stay the Same", and "5" indicates would "Get Much Better", please tell me how you think the following things would change if tourism in Lao PDR were to increase.

Perception of stakeholders on tourism impacts on Lao PDR	Much Worse	Worse	Stay the Same	Better	Much Better
1. Opportunities for revenue/income for stakeholders	1	2	3	4	5
2. Opportunities for employment	1	2	3	4	5
3. Opportunities for shopping for countrymen	1	2	3	4	5
4. Prices of goods and services	1	2	3	4	5
5. The cost of land and housing	1	2	3	4	5
6. The growth of local business/industry	1	2	3	4	5
7. Revenues for local government	1	2	3	4	5
8. Opportunities for recreation	1	2	3	4	5
9. The image of the County	1	2	3	4	5

2. Do you think the following are the problems/obstacles in tourism development and management in Lao PDR? (You can tick more than one as appropriate)

a) Human resources development [ ]
b) Investment/finance [ ]
c) Tax/customs [ ]
d) Immigration procedures [ ]
e) Transportation network [ ]
f) Marketing and promotion [ ]
g) Other(s) please specify _____

Thank you very much for your cooperation!