



# Interpretive Structural Modelling (ISM) of travel and tourism enablers

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**Abstract:** The purpose of the research paper is to identify the growth enablers of the Travel and tourism (T&T) in India. The paper begins with a literature review to investigate the significant enablers in the Indian T&T sector. Interpretive Structural Modelling (ISM) has been utilised to establish a hierarchical relationship among the enablers. This research will also help to formulate the strategies to overcome challenges in T&T industry. The research found that the dependent enablers are Safety and security, Human Resource, Information and Communication Technology, Infrastructure, Natural resources and Health and Hygiene. Independent enablers are Transport, Price and Policy rules and regulations. The Environment is an autonomous enabler. No enabler is linkage.

**Keywords:** India, Service sector, growth enablers, Interpretive Structural Modelling (ISM), structural self-interaction matrix (SSIM)

## 1. Introduction

### 1.1 Problem of the statement

A nation that can boast of its historical and cultural heritage and that has a heart as big as the universe is none other than India. Each corner of the country has a host of tourist destinations that will mesmerize everybody. The beautiful combination of backwaters, forests, wildlife and historical tours down south in Kerala with a similar experience with snow on top in Kashmir is what India can provide. With a capital investment of \$94.5 billion, the demand for the travel and tourism industry in India is expected to grow by 8.2% and is subjected to employ around 40,037,000 people by 2019. Even the hospitality sector, which is a \$23 billion industry, is expected to almost double in size in next five years.

According to the above paragraph, India seems to be a perfect place to be visited by the tourists but still the tourists arrival is increasing very slowly and growth is very low (2% only).

### 1.2 Problems of Indian Tourism Industry

The foregoing analysis of the growth of tourism in India shows that although the industry has registered an all round substantial development in the country during the last two-three decades, most of the potential, for its growth has not yet been exploited and much more is left to be desired. The limited, and rather unsatisfactory, the growth of this industry in our country has been due to a number of problems it is beset with and various difficulties it has been facing. The important factors, which have limited the growth of tourism in India, are mentioned below:

- Inadequate airline capacity, particularly during the peak tourist season, bad conditions of our airports, delays in getting the bookings, flight cancellations and delays render air travel in India nightmarish for foreign tourists.
  - Due to the appalling conditions of trains in India, tourists prefer to avoid it.
  - Lack of hygienic and comfortable accommodation for the tourists, in general, but reasonable good accommodation for low spending middle class tourists in particular, render tourism unattractive. Absence of motel hampers the smoothness, of long distance travels.
  - There is an absence of an up to date information systems with quick retrieval facilities causes inconvenience to tourists.
  - Another major factor inhibiting the growth of tourism is the seasonality of the industry with the busy season being limited to six months from October to March and heavy rush in November and December.
  - Lack of an integrated tourism promotion programme during the five-year plan periods has hindered the growth of tourism.
  - Indifference of many states and union territories to tourism, which has not yet been accorded industry status by them, is another factor limiting its growth.
  - Next factor is the failure of the mandarins of tourism to quickly adapt to the changing environment, for example the temporary closure of Jammu and Kashmir to tourists and socio-political and religious agitations in other northern states of the country rendering them unattractive to tourists, by developing and promoting alternative tourist destinations in South India.
  - A lukewarm attitude towards the domestic tourism due to the emphasis placed by the authorities on foreign tourism has been another limiting factor. We should not forget that domestic tourists have its own importance and its development provides a sound basis for the growth of international tourism.
- Not a single research is done on growth enablers on T&T industry. Some research was done earlier on the competitiveness of hotel industry in India (Roy S., 2011) but not as a whole on T&T industry. World Economic Forum framed the Travel and Tourism Competitiveness Index, which consists of 3 sub indexes (T&T regulatory framework, T&T business environment and infrastructure and T&T human, cultural, and natural resources). Extensive studies on growth enablers have not been carried out in T&T industry context and no study had been carried out to identify, classify and analyse the enablers in T&T. This paper uses literature review, ISM modelling, SSIM, Reachability matrix and Digraph to understand T&T growth enablers. The research can establish a relationship between T&T enablers and business success.

## **2. Literature review and tourism enablers**

### **1. Literature review and tourism enablers**

On the basis of the literature review carried out, it can be summarised that the growth of Travel and tourism is boosted significantly by some or all of the following enablers:

#### **2.1 Safety and security:**

Tourists usually prefer to avoid dangerous countries or places. The role of security staff and the role of a good security system is very crucial in T&T (Groenenboom. and Jones, 2003; Gill et al,2002; Rittichainuwat and Chakraborty, 2012; Chan and Lam, 2013). Tourism is also affected by terrorism, safety and security (Walker and Page,2007; Peter et al 2014; Goh and Law, 2007).

The impact of information security breach on hotel customers is quite vulnerable (Berezina et al, 2012) and sometimes management is not aware of it (Kima et al, 2013a and 2013b).

## **2.2 Health and hygiene:**

Safe drinking water and proper sanitation in a country can attract more number of travellers.

Food safety should follow the world class standards including restaurants, street food joints and airline catering.

Personal hygiene and workplace sanitation, food handling, and food preparation are quite important (Knight et al, 2007; Sheth et al, 2011; Chen et al, 2013) and business operators are not aware of it (Läikkö-Roto and Nevas, 2014; Burusnukul et al, 2011).

## **2.3 Transport (Air, Road, Railways and port) Infrastructure:**

A good transport helps ease of access within a country. A good national transport network consists of Air, Roads, railways and port transportation. It should be efficient and accessible to attract tourists.

Quality of airport facilities in a country can be improved with the help of benchmarking techniques (Graham, 2005; Upham and Mills, 2005; Rodríguez-Déniz and Voltes-Dorta, 2014). Herzberg's two-factor motivation theory was used to explore most frequently mentioned attributes of airport service quality. (Bogicevic et al, 2013). A conceptual model for airport service quality has been developed (Fodness and Murray, 2007) and airport safety and security key performance indicators (KPI) were also identified (Enoma and Allen, 2007). A modified SERVQUAL model was identified and zones of tolerance were also developed in railways (Cavana et al, 2007; Eboli and Mazzulla, 2014).

In India, train passengers were most dissatisfied with "extent of waiting"(Gupta and Datta, 2012)

## **2.4 Tourism infrastructure:**

The tourism infrastructure consists of hotel infrastructure and the existence of cab rental companies in the country, as well as a measure of its financial infrastructure for tourists (the availability of ATMs).

The strategic factors were identified to improve competitiveness in the Indian Hotel industry (Roy, 2011; Yilmaz, 2013). The efficiency of the hotel and restaurant sector has been measured with the help of data envelopment analysis (DEA). (Sanjeev, 2007; Luo et al, 2014; Huang et al, 2014). Kumar et al (2011) analysed the rapid diffusion of ATM (automatic teller machine) technology in Indian banking sector with the help of constant elasticity of substitution (CES) model. The "ATMqual" approach was developed and the dimensions of ATMqual are reliability, convenience, responsiveness, ease of use and fulfilment (Narteh, 2013).

## **2.5 Information and Communication technology (ICT):**

Based on a content analysis review of 107 journals papers published in tourism and hospitality journals between 2009 and 2013, researchers found that ICT is an integral part of travel and tourism industry. It was (Law et al, 2014).

Leung and Law (2007) reviewed only IT papers published from 1985 to 2004 in three leading tourism journals to understand the ICT applications in travel and tourism. Law et al. (2009) examined IT papers published from 2005 to 2007 in 57 hospitality and tourism journals and Law et al. (2013) analysed only Information Technology publications published in the Cornell Hospitality Quarterly between 1960 and 2011. Researchers also reviewed ICT papers published from 1999 to 2008 in eight hospitality journals to understand the application of ICT in travel and tourism (Ip et al., 2011).

In terms of security issues in ICT applications, Kim et al. (2013a, 2013b, 2013c) analysed the impact of hotel information security on system reliability and identify several important factors. Cloud technology can offer innovative service solutions to leisure restaurants (Chen and Tseng, 2013).

## **2.6 Price:**

The price competitiveness in the T&T industry is clearly an important element to take into account, with lower costs, increasing the attractiveness of some countries for many travellers.

Price is one of the important factors in hotel selection (Lockyer, 2005; Mattila and O'Neill 2003). The employee hospitability and perceived price can improve customer satisfaction in the hotel industry (Küçükergin and Dedeoğlu, 2014; Becerra et al, 2013; Lee, 2015; Matzler et al, 2006; Ye et al, 2012; Heo and Hyun, 2015).

## **2.7 Human resource:**

Strategic human resource management (SHRM) and its practices have the flexibility to add value to future hospitality firm performance (Davidson et al, 2011; Baum, 2015; Prayag and Hosany, 2015; Barron et al, 2014; Tracey, 2014; Tsai et al., 2009; Wang, 2013).

Hospitality school graduates must have Information Technology skills to succeed in a rapidly changing and developing industry environment. (Bilgihan et al, 2014).

## **2.8 Natural and Cultural resources:**

Heritage, medical tourism, destination and marketing can boost natural and cultural resources which acts as an important enabler.

Heritage tourism can be improved by the participation of stakeholder, private sector initiative, PPP model and effective urban management (Nana et al 2006; Roders and Oers, 2011; Ryan and Silvanto, 2009).

The perceived medical quality, service quality and enjoyment were critical components that significantly influenced the perception of value in medical tourism. (Wang, 2012; Guiry et al, 2013).

It was found a significant relationship between tourism destination dominance and marketing website usefulness. (Woodside et al, 2011; Das Gupta and Utkarsh, 2014; Chen and Gursoy, 2001) The country as a whole can be promoted as a favourable destination to international tourists with the help of a strategic long term marketing plan (Uzama, 2009). Future direction of tourism marketing research should be concentrating on consumer behaviour, branding, e-marketing and strategic marketing (Tsiotsou and Ratten, 2010).

### **2.9 Environment**

Kabashi et al, (2011) did a research on Green house gas (GHG) and air pollution emissions and options for reducing it by using STELLA software. The annual total emission of air pollutants (CO, NO<sub>x</sub>, CH<sub>x</sub>, SO<sub>2</sub> and dust) and GHG (CO<sub>2</sub>) from the year 2000 up to 2025 has been calculated. This model predicted that high emission of air pollutions and GHG in the short term from 2000 to 2010. Over 2015, due to implementing the emission reduction policies and introducing new technologies in transportation, a continual reduction in air pollution will take place, whereas the CO<sub>2</sub> output up to 2025 will be reduced by 25 percent in comparison with the emission values of 2007.

### **2. 10 Policy rules and regulations**

Baum, T., (1993) discussed the key elements or considerations which should be evaluated by those Policy makers of T&T. These factors are:

1. The tourism environment;
2. Tourism and the labour market;
3. Tourism in the community;
4. Tourism and education; and
5. Human resource development in the tourism industry.

Amoah and Baum, (1997) developed a framework which advocates the development and implementation of a specific tourism- education policy, to bring tourism education closer in line with national tourism policies.

The integrated policy approach combined tourism policy, education policy and labour policy to form a common denominator that would enhance tourism employment, hence tourism industry across the board (Aykaç, 2010; Thomas and Thomas, 2006; Dieke, 2003; Hanqin et al, 2002; Farmaki et al, 2015).

### **2. The Research objectives pursued refer to:**

Four broad objectives which are important for growth enablers in T&T Industry:

1. Identifying the growth enablers of T&T with the help of literature review.
2. To understand the relationship and hierarchy amongst them.
3. Classifying and gradeing the enablers with the help of dependencies and driving powers.
4. Forming a conceptual model of growth enablers of T&T.

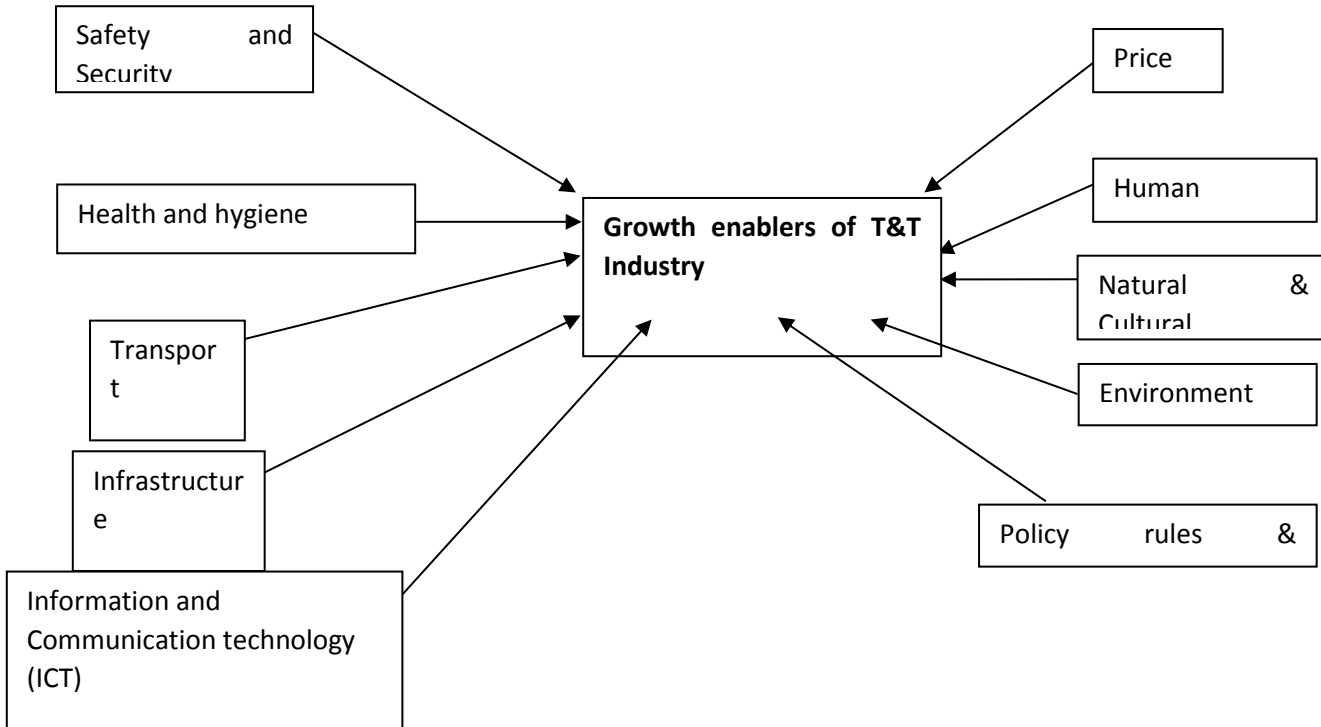
### **4. Interpretive Structural Modeling Methodology**

ISM can be used to structure a set of directly and indirectly related elements (Sage, 1977; Warfield J.W., 1974). Researchers found that this model can analyse a complex problem with a pictorial representation and words (Raj T. and Attri R. 2011; Raj T. et al, 2007; Ravi V. and Shankar R., 2005; Singh M.D. et al 2003;). This can also identify the relationships among different elements (Jharkharia S. and Shankar R., 2005). Researchers compared ISM with (Table 1) Multi-criteria-decision making (MCDM) techniques like AHP and ANP and found that ISM is superior than AHP and ANP.

AHP (Analytic Hierarchy process)	ANP (Analytic Network Process)	ISM (Interpretive Structural Modelling)
Discipline of hierarchy has to be strictly followed	Deals with loose networks	Involves a set of interconnected criteria
Assumes functional independence of an upper part of a hierarchy from its lower one	Takes into account the interdependencies and non-linearity	Establishes the “leads to” relationships among the criteria
Fails in complex real life Problems	Useful in real life non-linear problems	Captures the complexities of real life problems
Moderate ability for capturing dynamic complexity	Lower ability for capturing dynamic complexity	Higher ability for capturing dynamic complexity

**Table 1: Comparison of AHP, ANP and ISM**  
 (Source: Thakkar, J. et al, 2008)

ISM starts with an identification of variables, which are relevant to the problem.



**Figure 1: Growth enablers of T&T Industry**

Source: Authors' own

The ten T&T enablers have been analysed using the ISM method to show the relationships between the enablers. The levels of hierarchy were formed with the help of independency or dependency with other enablers.

The steps in the ISM methodology are: (Khurana et al., 2010; Singh and Kant, 2008; Ahuja et al., 2009):

- (i) **Factors identification:** The enablers are identified with a group problem-solving technique like brainstorming sessions.
- (ii) A contextual relationship has been developed.
- (iii) A **structural self-interaction matrix (SSIM)** is prepared.

- (iv) **Reachability matrix** is formed.
- (v) A directed graph or digraph is formed with the help of reachability matrix.
- (vi) The digraph is traferred into an ISM.

**6. Research methodology**

The research paper finds the growth enablers of T&T through a systematic literature review of publications on T&T. Later, twenty-five experts from the T&T industry and academia took up ISM. Experts were chosen based on their experience (more than 20 years) and available. An introductory brainstorming session and interview process were conducted to explain the research objectives to the experts. Then all the enablers were discussed and collected the responses from the experts to apply the ISM technique. Then enablers were placed in a hierarchy, formed the contextual relationships and framed the final relationship matrix.

**6.1 SSIM**

SSIM is prepared with the help of experts' opinion (Table 2).

Four characters are prepared to symbolise the direction of the relationship between the enablers (i and j):

- V= Enabler i helps to attain enabler j
- A= Enabler j will be attained by enabler i
- X= Enabler i and j will help to attain each other
- O = Enabler i and j are not related.

These V, A, X and O, different scenarios are described with the help of following examples.

V example: 'Transport' enabler will help to achieve 'Natural and cultural resources' enabler. This case is denoted by V

A example: Enabler 'Safety and Security' will be achieved by 'ICT'.

X: Enablers 'Health and Hygiene' and 'Price' will help to achieve each other.

O: Enablers 'Health and Hygiene" and 'ICT' are unrelated.

Enablers	10	9	8	7	6	5	4	3	2	1
1	A	O	O	O	O	A	A	A	O	X
2	A	A	O	A	X	O	O	X	X	
3	A	X	V	O	X	X	X	X		
4	X	O	X	X	X	X	X			
5	X	O	O	X	X	X				
6	X	O	X	X	X					
7	X	O	O	X						
8	X	O	X							
9	X	X								
10	X									

**Table 2: Structural self-interaction matrix**

Source: Authors' own

**6.2 Reachability matrix**

The binary matrix represents the existence of relationships among the growth enablers in T&T industry. The SSIM is converted into the reachability matrix by replacing V, A, X, O by 1 and 0.

The conversion rules are the following:

- If the (i, j) record in the SSIM is V, then the (i, j) record turns 1 and the (j, i) entry turns 0.
- The (i, j) record in the SSIM is A => the (i, j) record turns 0 and the (j, i) entry turns 1.
- The (i, j) record in the SSIM is X => the (i, j) record turns 1 and the (j, i) record also turns 1.
- The (i, j) record in the SSIM is O => the (i, j) record turns 0 and the (j, i) record also turns 0.

The final reachability matrix (Table 3) is constructed.

Enablers	1	2	3	4	5	6	7	8	9	10	Driving p	Level
1	1	0	0	0	1	0	1	0	1	0	4	III
2	0	1	0	0	0	0	0	0	0	0	1	I
3	1	1	1	1	1	1	0	1	1	0	8	VII
4	1	0	1	1	1	0	1	1	0	0	6	V
5	1	0	0	1	1	1	1	0	0	0	5	IV
6	0	1	1	1	1	1	1	1	0	0	7	VI
7	0	1	0	1	1	0	1	1	0	0	5	IV
8	0	0	0	0	0	0	0	1	0	0	1	I
9	0	1	0	0	0	0	0	0	1	0	2	II
10	1	1	1	0	1	1	1	1	1	1	9	VIII
Depen- Dence	5	6	4	5	7	4	6	6	4	1		

**Table 3: Final reachability matrix**

Source: Authors' own

### 6.3 Building the digraph

The digraph (directional graph) ISM model is formed with the help of final reachability matrix. Digraph is a graphical representation of the elements (Khurana et al., 2010). It helps to understand the relationship between the elements and analyzing the hierarchical levels. The lower triangular matrix (Table 4) is obtained after analyzing the final reachability matrix. The digraph is composed on the basis of the canonical form of reachability matrix. The links between the growth enablers are shown and arrows indicating the direction of each impact shown in Figure 2.

	E2	E8	E9	E1	E5	E7	E4	E6	E3	E10
C2	1	1	0	0	0	0	0	0	0	0
C8	1	1	0	0	0	0	0	0	0	0
C9	1	1	1	0	0	0	0	0	0	0
C1	1	1	1	1	0	0	0	0	0	0
C5	1	1	1	1	1	1	0	0	0	0
C7	1	1	1	1	1	1	0	0	0	0
C4	1	1	1	1	1	1	1	0	0	0
C6	1	1	1	1	1	1	1	1	0	0
C3	1	1	1	1	1	1	1	1	1	0
C10	1	1	1	1	1	1	1	1	1	1

**Table 4: Lower Triangular Matrix for directed graph**

Source: Authors' own

Enablers	Reachability set	Antecedent set	Intersection Set	Level
1	1,2,8,9	1,3,4,5,6,7,10	1	III
2	2,8	1,2,3,4,5,6,7,8,9,10	2,8	I
3	1,2,3,4,5,6,7,8,9	3,10	3	VII
4	1,2,4,5,7,8,9	3,4,6,10	4	V
5	1,2,5,8,9	3,4,5,6,10	5,7	IV
6	1,2,4,5,6,7,8,9	3,6,10	6	VI

7	1,2,7,8,9	3,4,6,7,10	5,7	IV
8	2,8	1,2,3,4,5,6,7,8,9,10	2,8	I
9	2,8,9	1,3,4,5,6,7,9,10	9	II
10	1,2,3,4,5,6,7,8,9,10	10	10	VIII

Table

5:

**Partitioning of variables**

Source: Authors' own

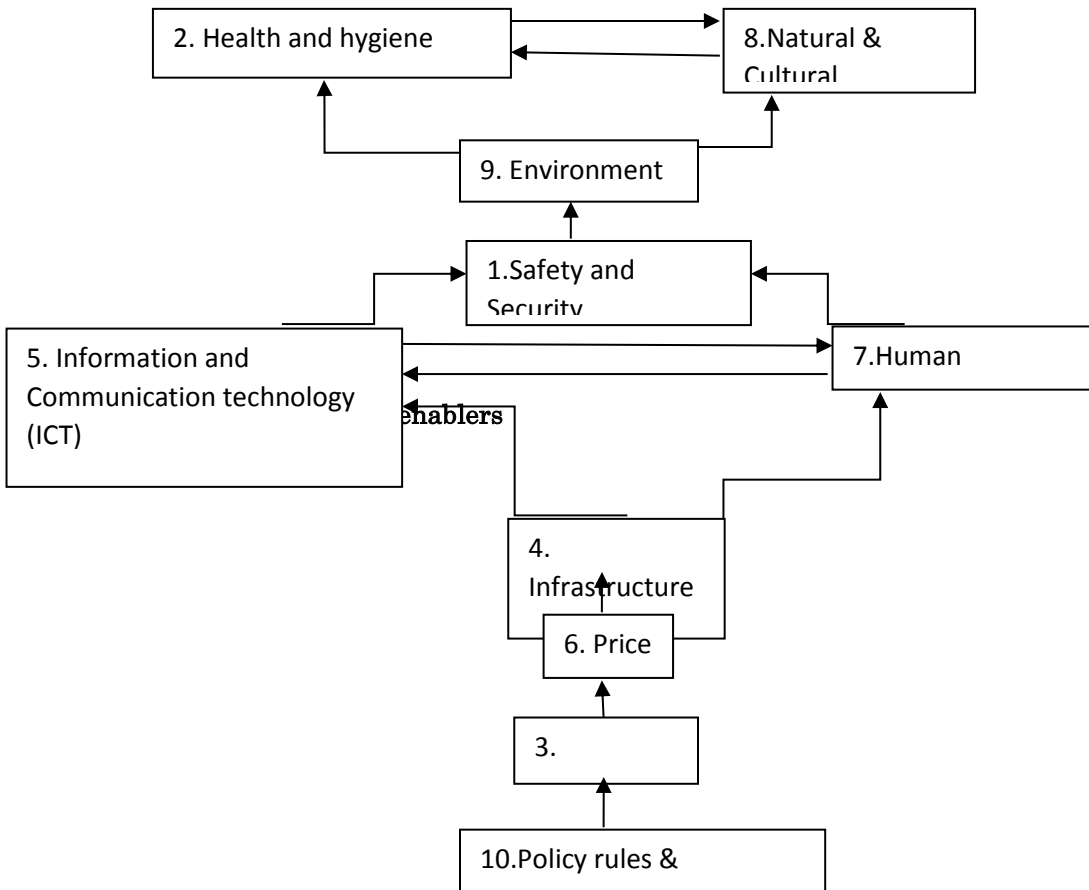
**7. Conclusions:** The digraph ISM model (figure 2) shows that the policy rules and regulations enabler is at the bottom. This enabler influences other enablers like transport directly and most other enablers indirectly while it cannot be influenced by other enabler. The “policy rules and regulations” is an important enabler that merits attention right at the beginning. It could also be understood that a successful “policy rules and regulations” will certainly improve the Indian T&T industry. The next enabler is “Transport”. This enabler influences other enablers, but it is influenced by “policy rules and regulations”.

“Price” is the next level enabler. It is influenced by transport and policy rules and regulations. At the same time it directly affects “Infrastructure” and indirectly affects other enablers.

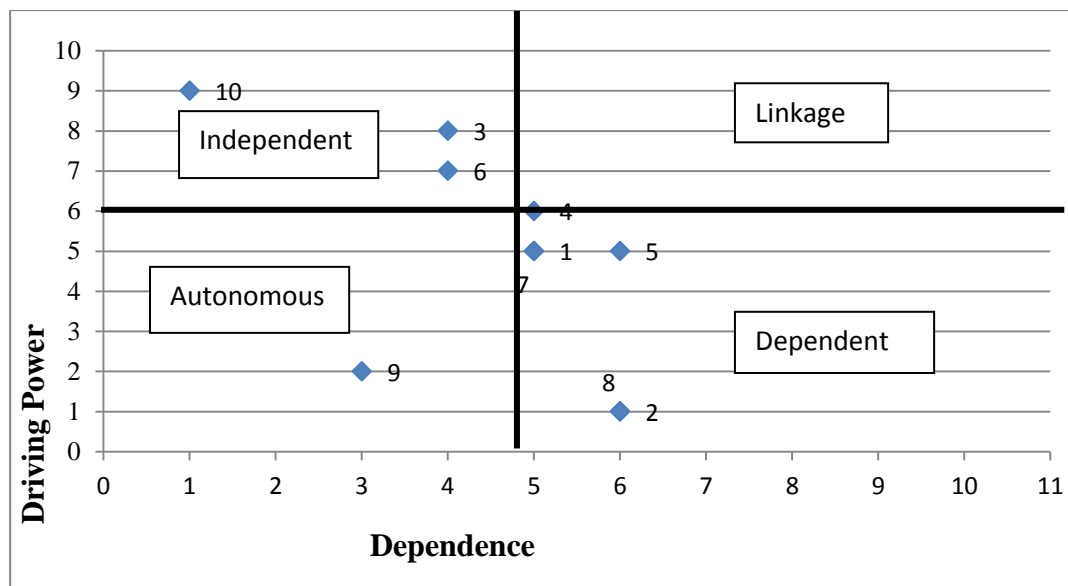
Next level enablers are the ICT and Human Resource, which act as a hub of the system. It indirectly influences a large number of enablers and is amenable to be influenced by other enablers. Hence, it can be understood that “ICT and Human Resource” are two extremely important enablers requiring the major management involvement.

The next level enabler is Safety and Security. Environment is the level II enabler. Health and hygiene, Natural and cultural resources are the level I enabler.

The dependence (X axis) and driving power (Y axis) diagram (figure 3) helps to classify different enablers into four clusters: Autonomous, dependent, linkage and independent enablers.







**Figure 3: Driving power and dependence diagram**

Source: Authors' own

Autonomous variables consist of weak driver and weak dependence enablers (Ahuja et al., 2009). These enablers are not attached from the system. This is located in the south-west quadrant. Environment enabler is part of the autonomous quadrant.

Dependent enablers consist of strong dependence and weak driver enablers. This is located in the southeast quadrant. Safety and security, Human Resource, Information and Communication Technology, Infrastructure, Natural resources and Health and Hygiene are the dependent enablers.

Linkage variables are made of strong driver and strong dependent enablers. These variables are quite unstable. These variables are influencing others. This is located in the northeast quadrant. No enabler is part of this quadrant.

Independent enablers comprise of strong driver and weak dependence enablers. These are located in the north-west quadrant. These are the very important enablers and need maximum management attention since they can influence other enablers to the maximum extent. Transport, Price and Policy rules and regulations are the independent enablers.

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