International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 04 Issue: 07 | July -2017 www.irjet.net p-ISSN: 2395-0072

MODELLING OF BARRIERS OF PPP IN INFRASTRUCTURE

Mohammad Aalam[1], Rahul Jadaun[2], Dr. R.K. Mehta[3], Dr. Mahendra Rai[4], Mohd. S. Siddiquee[5], O.P.Yadav[6]

[1]Guest Faculty, Dept. of Mechanical Engineering, NDUAT, Kumarganj, Faizabad, India
[2]B. Tech. Student, Dept. of Mechanical Engineering, NDUAT, Kumarganj, Faizabad, India
[3]Professor, Dept. of irrigation and drainage Engineering, NDUAT, Kumarganj, Faizabad, India
[4]Professor, Dept. of soil and water conservation Engineering, NDUAT, Kumarganj, Faizabad, India
[5]Assistant Professor, Dept. of Mechanical Engineering, Azad Institute of Engineering & Technology, Lucknow, India
[6]Assistant Professor, Dept. of Mathematics, NDUAT, Kumarganj, Faizabad, India

---

Abstract - *This paper worries the equity dimension of partnerships between disadvantaged communities and local governments and private sector corporations to provide basic services and facilities. It examines the required conditions for fulfilling the probability that such partnerships can assist the benefits of the poor and the critical role of state in intervention to level the playing field for such a partnership. In environment of decentralizing third world governments, the paper highlights conceptual irregularities underlying public-private partnerships that lead them to deliver results opposite to those they claim. The paper points to the undecided and even false core of such partnerships that enables their effective operation as a form of sale, advancing the interests of the private sector and the market under the banner of sharing power with the poor and the state.*

Key Words: **Barriers, Public Private Partnership (PPP), Interpretive Structural Modelling (ISM),Total Interpretive Structural Modelling (TISM)**

1. INTRODUCTION

Now day society expects to see the government more as a governor and regulator rather than the direct provider of public services. In addition, it needs infrastructure of better quality, more effective facility of public services, as well as better use of public money. Considering all this, Public Private Partnership are seen as an earning mode that may fulfil these changing needs. Nevertheless, PPPs are not a 'miracle' solution (European Commission, 2003; PPP is not a new phenomenon even though it is seeming as such due to its recent popularity. Growing interest is a result of changing attitudes as well as opportunities of the society towards the government and public services (Grimsey & Lewis, 2004). Harris, 2004; Public-private partnership a concept used widely in the public obtaining that lacks both transparency and united definition (Meidute & Paliulis, 2011). Meidute & Paliulis, 2011) to the problems of the straight obtaining; they are difficult and costly and, as a result, only certain projects qualify for the use of public-private partnerships.

2. LITERATURE REVIEW ON BARRIERS OF PPP

Some include cooperation between public organizations and voluntary organizations as distinct forms of partnerships (Salamon, 1995). PPP's can be defined in broad terms or in more narrow terms. In broad terms, it simply means any form of cooperation between organizations in the public sector and the private sector, usually meaning "cooperative ventures between the state and private business (Linder, 1999). Savas (2000) lists a number of possible types of PPPs. Contracting out can be viewed as a form of PPP in this perspective (Savas, 2000) (Broadbent, et al., 2003) observe that Public private partnerships are promised arrangements between public sector organizations and private sector investors for joint, mutual and cooperative facility and financing of public projects and services. They arise out of the understanding that although the public sector is accountable for the delivery of infrastructure projects, it often meetings financial, technical and institutional boundaries in availing such projects.

Public Private Partnership fluctuate from country to country in terms of information and operation even within the developed countries (Hodge, 2004). Bovaird (2004) specified that through PPPs the public sector starts long-term partnerships which are essentially working arrangements based on a mutual assurance between a public sector organization with any organization outside of public sector. Literature offers widespread evidence of a growing utilization of PPPs in the delivery of public infrastructure facilities and services to meet the numerous needs of modern economies. It should be noted, however, that such an explanation covers only a part of this broad concept. It is widely acknowledged within the relevant literature that there is no clear definition for PPP which would cover all aspects of different relationships that these partnerships encompass (Daube, Vollrath, & Alfen, 2007; Hodge & Greve, 2007; OECD, 2008) and at the same time restricting it to a more narrow description.

3. BARRIERS ON PPP

A circumstance or obstacle that keeps people or things apart or prevents communications or progress is known as barriers. Here, we are taking some important barriers of public private partnership

1. Legal
2. Regulatory Environment
3. Financial Problem
4. Political risk
5. Technological
6. Decentralization
7. Policy and Institutional, and
8. Resistance to change

3.1Legal

- The critical success factors (CSFs) are those principal areas that are crucial for reaching the stated project's goals (Rockart, 1982).
- Lack of well-established legal framework (Li et al. (2005))
- The literature demonstrated inadequate coverage of PPP legal regime, poor regulatory frameworks and weakness in enforcement of policy,(Corbett, P. and Smith, R. (2006)
- lack of institutional capacity and PPPs strategy,(Chang, M., & Liu, W. (2009)
- A lack of project preparation capacity on the part of the public sector (Mahalingam (2010))

3.2Regulatory Environment

- lack of coordination between national and regional governments,(Corbett, P. and Smith, R. (2006)
- Limitation of Environmental liabilities (Pirman (2012)
- Restrictions on transfer of rights in public assets to private sector operator (PPPIRC (2013)
- Land acquisition difficult and time consuming (Babatunde, Perera, Udeaja, & Zhou (2015) The prior studies have revealed that land acquisition problems, lack of coordination between national and regional governments, lack of transparency and accountability, and acquisition of land for project from third parties as environmental barriers to PPP projects.
- There is no independent PPP regulator as of now. In order to attract more domestic and international private funding of the infrastructure, a more robust regulatory environment with an independent regulator is essential. (Sudhansu Sekhar Nanda 6 September 2015).

3.3Financial problem

- With commercial banks reaching the sectoral exposure limits, and large Indian infrastructure companies being highly leveraged, funding the PPP project is getting difficult.(A.M. Abdel Aziz,2007)
- Insufficient public budgets due to unstable or weak revenues (Allain-Dupré, 2011), chronic and long-term underinvestment (Anton, B. et al., 2014) or threats to sub-national government budgets or income from mitigation action (GIZ, 2013);
- Lack of access to affordable finance (international finance in particular) and high investment costs (Anton, B. et al., 2014; GGBP, 2014; GIZ, 2013; UNEP, 2013; Clapp et al., 2010) often due to real or perceived market risk (Gouldson et al.,2012);
- Difficulty mobilising private funding without the backing of national government (Corfee-Morlot et al., 2012) particularly for medium to-small sub-national governments (Anton, B. et al., 2014)

3.4Political risk

- Contagion effects of domestic/ regional economic and political environment (Corbett, P. and Smith, R. (2006)
- A lack of political willingness to develop PPPs (Mahalingam (2010))
- Sub-national governments lacking a formal mandate to deal with climate protection and energy issues (ICLEI, 2014a)
- No provision by governments of incentives/ subsidies/ viability gap funding **(**Babatunde, Perera, Udeaja, & Zhou (2015)**)**
- Lack of awareness/ poor understanding about PPPs by politicians/ decision makers (Babatunde, Perera, Udeaja, & Zhou (2015)

3.5Technology

- lack of innovations in design (Corbett & Smith (2006)
- The absence of an enabling institutional environment for PPPs(Mahalingam (2010))
- PPP process not clearly defined. Non-availability of model concession agreement (Babatunde, Perera, Udeaja, & Zhou (2015))

3.6Decentralization

- Lack of suitable skills and experience (Chan et al. (2006)

- Decentralization is lightly winked with local government system and has been practices in the country in varying degree since colonial times. (L. Massoil 19 october 2009)
- Uncertainty and lack of a clear project pipeline, delayed communication of decisions and protracted procurement processes (Gunnigan, L. and Rajput, R. (2010)
- Decentralization is widely lauded as a key component of a good governance and development . it is also broadly recognized as a precess frought with complexity and potentialfailure. (Stacey white, December 2011)
- PPP are complex and relatively inflexible structures(Kosovo Ministry of Economy & Finance (2012)

3.7Policy and institutional

- Examined the principles that need to be addressed in order to ensure the successful implementation of a PPP program(Abdel Aziz, 2007)
- The limited institutional capacity to undertake large and complex projects at various central ministries and especially at state and local bodies' level hinder the translation of target into projects.(Sudhansu Sekhar Nanda 6 september 2015)
- Lack of policy framework and guidelines regarding applicability / choice making from out of full set of applications of ITS in urban transport system / infrastructure (2016 Deloitte Touche Tohmatsu India LLP)

3.8Resistance to change

- Negative reaction is largely because change brings with it increased pressure, stress and uncertainty for employees (Armenakis & Bedeian, 1999).
- The reasons for the failure range from a lack of understanding surrounding an organisation's capacity for change to other human factors, such as employee resistance toward organisational change (Martin, Jones & Callan, 2006).

Barriers	Authors and Years
Legal	• (Li et al.(2005)) • (Mahalingam (2010)) • (Rockart(1982)) • (Corbett, P. and Smith, R(2006)) • (Chang, M., & Liu, W(2009))
Regulatory environment	• (Babatunde, Perera, Udeaja, & Zhou(2015)) • (Sudhansu Sekhar Nanda(2015)) • (Pirman(2012)) • ,(Corbett, P. and Smith, R(2006).)
Financial problem	• (Allain-Dupré(2014)) • (Anton, B. et al., ; GGBP,; GIZ; UNEP; Clapp et al(2013)) • (Corfee-Morlot et al(2012)) • A.M. Abdel Aziz(2007))
Political risk	• (Babatunde, Perera, Udeaja, & Zhou(2015)) • (Mahalingam(2010)) • (Babatunde, Perera, Udeaja, & Zhou(2008) • (ICLEI(2014))
Technological	• (Babatunde, Perera, Udeaja, & Zhou(2015)) • (Corbett & Smith(2006)) • (Mahalingam(2010))
Decentralization	• (L. Massoil(2009)) • . (Stacey white(2011) • (Kosovo Ministry of Economy & Finance(2012)) • (Chan et al(2006)) • (Gunnigan, L. and Rajput, R(2010))
Policy and Institutional	• (Deloitte Touche Tohmatsu India LLP(2016)) • (*Abdel Aziz*(2007)) • (Sudhansu khar Nanda;2015)
Resistance to change	• (Martin, Jones & Callan(2006)) • (Armenakis & Bedeian(1999)) • (Fine(1986))

4. INTERPRETIVE STRUCTURAL MODELING (ISM)

It is generally felt that individuals or groups encounter difficulties in dealing with complex issues or systems. The complexity of the issues or systems is due to the presence of a large number of elements and interactions among these elements. The presence of directly or indirectly related elements complicates the structure of the system which may or may not be articulated in a clear fashion. It becomes difficult to deal with such a system in which structure is not clearly defined. Hence, it necessitates the development of a methodology which aids in identifying a structure within a system. Interpretive structural modelling (ISM) is such a methodology1. ISM is defined as a process aimed at assisting the human being to better understand what he/she believes and to recognize clearly what he/she does not know (Rajesh Attri, Nikhil Dev and Vivek (1st February 2013)). Its most essential function is organizational. The information added (by the process) is zero. The value added is structural2. The ISM process transforms unclear, poorly articulated mental models of systems into visible and well-defined models. Interpretive structural modelling (ISM)
The various steps, which lead to the development of an ISM model, are illustrated below.

Step 1: Structural Self-Interaction Matrix (SSIM): For analyzing the factors, a contextual relationship of 'leads to' or 'influences' type must be chosen. This means that one factor influences another factor. On the basis of this, contextual relationship between the identified factors is developed. Keeping in mind the contextual relationship for each factor and the existence of a relationship between any two factors (*i* and *j*), the associated direction of the relationship is questioned. The following four symbols are used to denote the direction of relationship between two factors (*i* and *j*): (a) *V* for the relation from factor *i* to factor *j* (i.e., factor *i* will influence factor *j*) (b) *A* for the relation from factor *j* to factor *i* (i.e., factor *i* will be influenced by factor *j*) (c) *X* for both direction relations (i.e., factors *i* and *j* will influence each other) (d) O for no relation between the factors (i.e., barriers *i* and *j* are unrelated). Based on the contextual relationships, the SSIM is developed. To obtain consensus, the SSIM should be further discussed by a group of experts. On the basis of their responses, SSIM must be finalized.

Step 2: Reachability Matrix: The next step in ISM approach is to develop an initial reachability matrix from SSIM. For this, SSIM is converted into the initial reachability matrix by substituting the four symbols (i.e., V, A, X or O) of SSIM by 1s or 0s in the initial reachability matrix. The rules for this substitution are as follows: (a) If the (*i, j*) entry in the SSIM is V, then the (*i, j*) entry in the reachability matrix becomes 1 and the (*j, i*) entry becomes 0. (b) If the (*i, j*) entry in the SSIM is A, then the (*i, j*) entry in the matrix becomes 0 and the (*j, i*) entry becomes 1. (c) If the (*i, j*) entry in the SSIM is X, then the (*i, j*) entry in the matrix becomes 1 and the (*j, i*) entry also becomes 1. (d) If the (*i, j*) entry in the SSIM is O, then the (*i, j*) entry in the matrix becomes 0 and the (*j, i*) entry also becomes 0. Following these rules, the initial reachability matrix is prepared. 1* entries are included to incorporate transitivity to fill the gap, if any, in the opinion collected during development of structural self-instructional matrix. After incorporating the transitivity concept as described above, the final reachability matrix is obtained.

Step 3: Level partitions: From the final reachability matrix, for each factor, reachability set and antecedent sets are derived. The reachability set consists of the factor itself and the other factor that it may impact, whereas the antecedent set consists of the factor itself and the other factor that may impact it. Thereafter, the intersection of these sets is derived for all the factors and levels of different factor are determined. The factors for which the reachability and the intersection sets are the same occupy the top level in the ISM hierarchy. The top-level factors are those factors that will not lead the other factors above their own level in the hierarchy. Once the top-level factor is identified, it is removed from consideration. Then, the same process is repeated to find out the factors in the next level. This process is continued until the level of each factor is found. These levels help in building the diagraph and the ISM model.

Step 4: Conical matrix: Conical matrix is developed by clustering factors in the same level across the rows and columns of the final reachability matrix. The drive power of a factor is derived by summing up the number of ones in the rows and its dependence power by summing up the number of ones in the columns14, 15, 16. Next, drive power and dependence power ranks are calculated by giving highest ranks to the factors that have the maximum number of ones in the rows and columns, respectively.

Step 5: Digraph: From the conical form of reachability matrix, the preliminary digraph including transitive links is obtained. Itis generated by nodes and lines of edges7,14, 15,16. After removing the indirect links, a final digraph is developed. A digraph is used to represent the elements and their interdependencies in terms of nodes and edges or in other words digraph is the visual representation of the elements and their interdependence17,18. In this development, the top level factor is positioned at the top of the digraph and second level factor is placed at second positionand so on, until the bottom level is placed at the lowest position in the digraph.

Step 6: ISM Model: Digraph is converted into an ISM model by replacing nodes of the factors with statements. Advantages of ISM approach**:** ISM offers a variety of advantages like:

i. The process is systematic; the computer is programmed to consider all possible pair wise relations of system elements,

either directly from the responses of the participants or by transitive inference.

ii. The process is efficient; depending on the context, the use of transitive inference may reduce the number of the required relational queries by from 50- 80 percent.

iii. No knowledge of the underlying process is required of the participants; they simply must possess enough understanding of the object system to be able to respond to the series of relational queries generated by the computer.

iv. It guides and records the results of group deliberations on complex issues in an efficient and systematic manner.

v. It produces a structured model or graphical representation of the original problem situation that can be communicated more effectively to others.

vi. It enhances the quality of interdisciplinary and interpersonal communication within the context of the problem situation by focusing the attention of the participants on one specific question at a time.

vii. It encourages issue analysis by allowing participants to explore the adequacy of a proposed list of systems elements or issue statements for illuminating a specified situation.
viii It serves as a learning tool by forcing participants to develop a deeper understanding of the meaning and significance of a specified element list and relation.

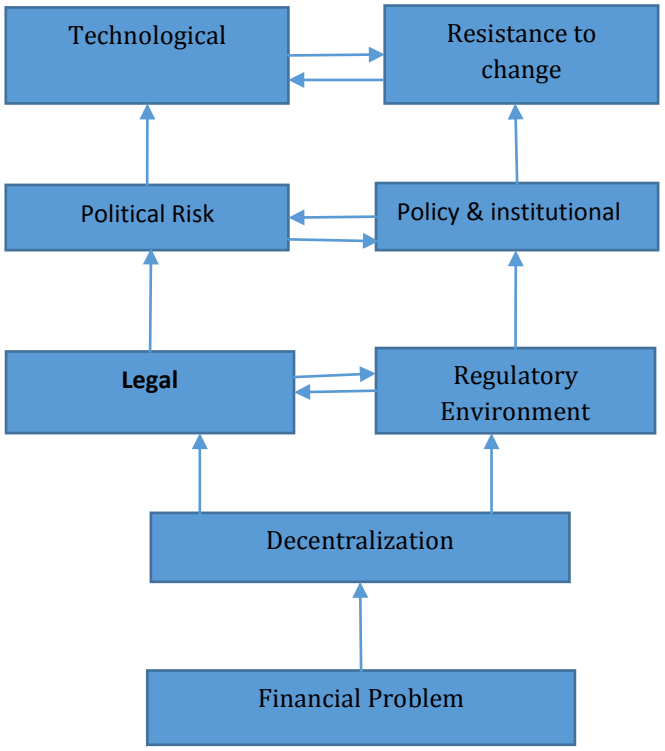
ix. It permits action or policy analysis by assisting participants in identifying particular areas for policy action which offer advantages or leverage in pursuing specified objectives.

Structural Self-Iteration Matrix (SSIM)

		8	7	6	5	4	3	2
1	Legal	A	X	A	O	O	X	O
2	Regulatory Environment	V	V	A	O	A	O	
3	Financial problem	V	X	O	V	O		
4	Political Risk	V	V	X	O			
5	Technology	A	A	A				
6	Decentralization	V	V					
7	Policy and Institutional	X						
8	Resistance to Change							

Final Reachability Matrix

Factor	1	2	3	4	5	6	7	8	D.P.
1	1		1	**1***			1	**1***	**5**
2		1		**1***			1	1	**4**
3	1		1		1	**1***	1	1	**6**
4		1		1		1	1	1	**5**
5					1			**1***	**2**
6	1	1		1	1	1	1	1	**7**
7	1		1	**1***	1		1	1	**6**
8	1				1		1	1	**4**
Drive Power	**5**	**3**	**3**	**5**	**5**	**3**	**7**	**8**	



INTERPRETIVE STRUCTURAL MODELLING

5. TOTAL INTERPRETIVE STRUCTURAL MODELLING (TISM)

Origin of TISM is from Interpretive Structural Modeling (ISM) technique facilitating development of graphical representations of complex systems. Research related to ISM dates back to 1970s. It is a methodology which enables individuals to establish complex relationships between multiple elements in a complex situation (Warfield, 1974). ISM is an interactive learning process. The method is interpretive in that the group's judgment decides whether

and how items are related; it is structural in that, on the basis of the relationship, an overall structure is extracted from the complex set of items; and it is modeling in that the specific relationships and overall structure are portrayed in a digraph model (Sage,1977). ISM is a tool which permits identification of structure within a system. The system may be technical, social, medical or any system which contains identifiable elements which are related to one another in some fashion (Farris & Sage ,1975). Nasim (2011) have adopted a modified version of ISM called the TISM. The process of interpretive structural modeling has been revisited and upgraded to TISM. It incorporates the interpretation of each relation i.e. not only gives direct relation but also gives transitive relation. This is not only useful in making the structural model fully interpretive, but also contributes in creating a knowledge base of the interpretive logic of all the relations.

6. METHODOLOGY

ISM is an interpretive methodology goes as the judgment of the group decides the relationship of different elements in the system.(Sushil (2012) An overall structure is extracted from the set of elements hence it is structural in the basis of mutual relationships and the overall structure are portrayed in a diagraph model hence it is a modeling technique. Total ISM is also following some of the steps of ISM. Reachability and partition levels are adopted as it is in the process of TISM .It is having a step by step process and is briefly outlined below.

Structural Self-Interaction Matrix (SSIM): The process of TISM is same as like ISM from beginning to final reachability matrix.

code	Variable	V8	V7	V6	V5	V4	V3	V2
V1	Legal	A	X	A	O	O	X	O
V2	Regulatory Environment	V	V	A	O	A	O	
V3	Financial problem	V	X	O	V	O		
V4	Political risk	V	V	X	O			
V5	Technological	A	A	A				
V6	Decentralizatio n	V	V					
V7	Policy and Institutional	X						
V8	Resistance to Change							

Table 1 Structural self interaction matrix

Reachability Matrix (RM)

RM is prepared from SSIM by transforming the information in each entry of the SSIM into 1's and 0's in the reachability matrix. This transformation is based on the relation given in Table 2. RM thus prepared is given in Table 3 below. Entry for a variable with itself is represented by 1.

(i-j) Entry	(i to j) Relation	(j to i) Relation
V	1	0
A	0	1
X	1	1
O	0	0

Table 2 Rule for transforming SSIM to RM

Variable Code	V1	V2	V3	V4	V5	V6	V7	V8
V1	1	0	1	0	0	0	1	0
V2	0	1	0	0	0	0	1	1
V3	1	0	1	0	1	0	1	1
V4	0	1	0	1	0	1	1	1
V5	0	0	0	0	1	0	0	0
V6	1	1	0	1	1	1	1	1
V7	1	0	1	0	1	0	1	1
V8	1	0	0	0	1	0	1	1

Table3 Reachability matrix

Partitioning the Reachability Matrix in to Different Levels

The level partition is carried out to know the position of variables level-wise. Reachability set for a variable represents variables that carry value 1 in row of that variable. Similarly, antecedent set for a variable represents variables that carry value 1 in column of that variable. Intersection of the reachability set and the antecedent set will be the same as the reachability set if the element is at the top level. The top level elements satisfying the above condition should be removed from the element set and the exercise is to be repeated iteratively till all the levels are determined (Sushil, 2012). Table 4 shows the iterations and Table 5 gives levels of all the variables obtained from iterations.

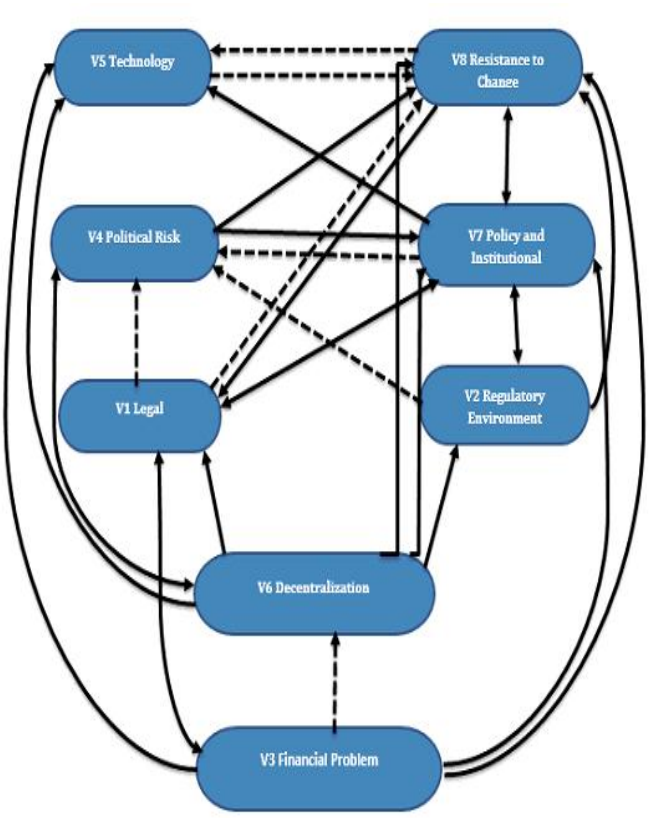
Sr.No.	Variable	Code	Level in TISM
1	Technological	V5	I
2	Resistance to change	V8	I
3	Political Risk	V4	II
4	Policy and Institutional	V7	II
5	Legal	V1	III
6	Regulatory Environment	V2	III
7	Decentralization	V6	IV
8	Financial Problem	V3	V

Variable and respective level

Diagraph with Significant Transitive Links

The elements are arranged graphically in levels and the directed and significant links are shown as per the relationships observed in the reachability matrix.

Diagraph with Significant Transitive Links



LIMITATIONS FOR PUBLIC PRIVATE PARTNERSHIP

- **Higher transaction cost:** PPP's try to reduce total project cost, however trending costs and developing costs are generally higher.
- **Lack of coordination:** As there are two or more parties involved in PPP there are chances of misunderstandings.
- **Inefficiencies:** PPP can lead to Inefficiency due to lack of contestability and competition.
- **Culture Gap:** There exists a culture gap between public and private sector which may result in loss of confidence in each other.
- **Different Objectives:** The private sectors motive to take part in PPP is to mainly make profits but the motive of public sector is service oriented.
- **Corruption:** PPP projects are always behind the risk of corruption as there are too many people and processes involved in the completion of the project.
- **Political and Legal Problems:** Changing Governments and major changes in law has sometimes a very bad impact on PPP projects.

FUTURE SCOPE FOR PPP

Infrastructure carries to the development and welfare so implementation of PPP in infrastructure will tend to the overall development of the society as well as of country, so the scope of PPP in future is bright to sustain the conventional type projects and into the new upcoming non-conventional development projects.

7. CONCLUSION

The Government plays a predominant role in any PPP. Hence it has to follow certain successful strategies in order to become a better partner. The key elements of a successful PPP are as follows: 1. The Government should look at the long-term value in a partnership2. Selection of the right partner becomes imperative for the government to achieve tangible outputs and create the 'best value'. A partner's experience in the specific area of partnership being considered is an important factor in identifying the right partner. It concludes that the more complete transfer of risk that is possible under a PPP, results in better project evaluation and stronger incentives to innovate and minimize whole of life costs. But these advantages must be balanced against the large contract negotiation costs, the inflexibilities of a long-term contract and the reduced competitive pressures on performance after the contract has been entered into (compared with a situation where the contract is re-tendered periodically over the life of the infrastructure).

REFERENCE

- A.M. Abdel Aziz, (2007) "Successful Delivery of Public-Private Partnerships for Infrastructure Development," Journal of Construction Engineering and Management, 133/12,918 -931.ADB (2006), Workshop Report, Facilitating Public–Private Partnership for Accelerated
- Allain-Dupré, D., (2011). Multi-level Governance of Public Investment: Lessons from the Crisis. OECD Regional Development Working Papers 2011/05.Organisation for Economic Cooperation and Development (OECD).
- Anton, B., Cambray, A., Dupar, M., Westerlind-Wigstroem, A. and Gogoi, E. (2014). Close to home: subnational strategies for climate compatible development. CDKN Working Paper. Climate and Development Knowledge Network (CDKN).
- Armenakis, A. & Bedeian, A. (1999). Organisational Change: A Review of Theory and Research in the 1990s. Journal of Management, 2(3), 293-315.
- Babatunde, S., Perera, S., Zhou, L., & Udeaja, C. (2015). Barriers to public private partnership projects in developing countries. Engineering, Construction And Architectural Management, 22(6), 669-691.
- Bovaird, T., (2004), —Public–Private Partnerships: from Contested Concepts to Prevalent Practice‖, International Review of Administrative Sciences 2004; Vol.70, No 2, pp. 199-214
- Broadbent, J., Gill, J and Laughlin, R. (2003), —Evaluating the Private Finance Initiative in the National Health Service in the UK‖, Accounting, Auditing & Accountability Journal, 16 (3), 422-45.
- Burnett Michael (2005/3), EIPASCOPE City Region. Centre for Low Carbon Futures.
- Corbett, P. and Smith, R. (2006) "An analysis of the success of the private finance initiative as the government's preferred procurement route", Proceedings Accelerating Excellence in the Built Environment Conference, 2-4 October, Birmingham, UK
- Corfee-Morlot, J., Marchal, V., Kauffmann, C., Kennedy, C., Stewart, F., Kaminker, C., Ang, G. (2012). Towards a Green Investment Policy Framework: The case of low-carbon, climate resilient Infrastructure. OECD Environment Working Papers No. 48. Organisation for Economic Cooperation and Development (OECD) Environment, Transport and Works Bureau (2004). Reference Guide on Selection of Procurement Approach and Project Delivery Techniques. Technical Circular, No.32/2004
- Farris D.R., Sage A.P. (1975) 'On the use of interpretive structural modeling for worth assessment', Computers & Electrical Engineering, 2 (2–3), 149–174.
- Fine, S. F. (1986). Technological innovation, diffusion and resistance: A historical perspective. Journal of Library Administration, 7(Spring), 83- 108.
- GGBP. (2014). Green Growth in Practice: Lessons from Country Experiences. Green Growth Best Practice.
- GIZ. (2013). Sub-national involvement in NAMA development: Current and emerging practice towards vertical integration. GIZ, Germany.
- Gouldson, A., Kerr, N., Topic, C., Dawkins, E., Kuylenstierna, J., Perce, R. (2012). The Economics of Low Carbon Cities: A Mini-Stern Review for the Leeds
- Grimsey, D., & Lewis, M. K. (2002). Evaluating the risks of public private partnerships for infrastructure projects. International Journal of Project Management, 20(Journal Article), 107-118.
- Harris, S. (2004). Public Private Partnerships: Delivering Better Infrastructure Services. Working Paper, Inter-American Development Bank, Working Paper(Journal Article).
- Hodge, Graeme 2004, —Risks in public–private partnerships: shifting, sharing or shirking?‖, Asia Pacific Journal of Public Administration, vol. 26, no. 2, pp. 157–79.
- ICLEI. (2014a). LG Action – Final Report: Results and highlights of the 'Networking action to involve Local Governments in the EU and international energy and climate debate' project. ICLEI - Local Governments for Sustainability European Secretariat (ICLEI Europe). Infrastructure Development in India.
- Jones, G. & George, J. (1998). The Experience and Evolution of Trust: Implications for Cooperation and Teamwork. Academy of Management Review, 23(3), 531-546.
- K.K. Weththasinghe1, T. Gajendran2, G. Brewer31Lecturer, Department of Building Economics, University of Moratuwa 2,3Assosiate professor, School of Architecture and Built Environment, University of Newcastle kaushalyaweththasinghe@gmail.com https://www.researchgate.net/publication/308166890_barriers_in_proper_implementation_of_public_private_partnerships_ppp_in_sri_lanka [accessed May 18, 2017].

- L Shastry Tharun(2012), International Journal of Business and Management Invention
- Li, B., Akintoye (2005) "Perceptions of Postive and Negative Factors Influencing the Attractiveness of PPP/PFI Procurement for Construction Projects in the UK: Findings froma Questionnaire Survey". Engineering, Construction and Architectural Management, 12(2): 125-148.
- Linder, S., (1999), —Coming to Terms with the Public-Private Partnership: A Grammar of Multiple Meanings‖, The American Behavioral Scientist, Vol.43, No.1, pp. 35-51
- Mahalingam, A. (2010) "PPP Experiences in Indian Cities: Barriers, Enablers, and the Way Forward". Journal of Construction Engineering and Management, 419-429.
- Meidute, I., & Paliulis, N. K. (2011). Feasibility study of public-private partnership. International Journal of Strategic Property Management, 16(5), 257-274.
- Nasim, S. (2011) 'Total interpretive structural modeling of continuity and change forces in e-government', Journal of Enterprise Transformation, 1 (2), 147-68.
- Rajesh Attri1, Nikhil Dev1 and Vivek Sharma Department of Mechanical Engineering, YMCA University of Science and Technology, Faridabad, INDIA Department of Mechanical Engineering, Advanced Institute of Technology and Management, Palwal, INDIA Available online at:www.isca.in Received 27th November 2012, revised 27th January 2013, accepted 1st February 2013
- Rockart, J. F. (1982), "The changing role of the information systems executive: A critical success factors perspective", Sloan Management Review, Vol. 24 No. 1, pp. 3 13.
- Sage, A.P. (1977) Interpretive Structural Modelling: Methodology for Large Scale Systems, McGraw-Hill, New York, NY, 91-164.
- Salamon, L. M., (2002), —The tools of government: a guide to the new governance‖, Oxford University Press.
- Savas, E.S., (2000), Privatization and Public–Private Partnerships, Seven Bridges Press: New York.
- Sudhansu Sekhar Nanda 6 september 2015) International Journal Of Core Engineering & Management (IJCEM) Volume 2, Issue 6, September 2015
- Sushil (2012) 'Interpreting the interpretive structural model: organization research methods', Global Journal of Flexible Systems Management (June 2012), 13 (2), 87–106.
- UNEP. (2013). The Emissions Gap Report 2013: A UNEP Synthesis Report. United Nations Environment Programme (UNEP).

BIOGRAPHIES

Mohammad Aalam has completed B.Tech from Aligarh Muslim University, Aligargh in Mechanical Engineering and M. Tech. in Production & Industrial Engineering from Jamia Millia Islamia University New Delhi.He is working as a Guest faculty in Dept. of Mechanical engineering in NDUAT Kumarganj, Faizabad. He is working on various methodology/tools as ISM, TISM, IRP and FUZZY-MICMAC.

Mr. Rahul Jadaun is Mechanical Engineer from NDUAT Kumarganj Faizabad. His interest of area is industrial engineering.