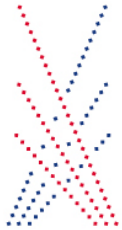

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Analysis of Motives for Alliance Formation Using Total Interpretive Structural Modelling

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Summary

The purpose of this study is to examine existing literature on motives for formation of strategic alliances to map the authors, ascertain co-citational links between them, and to estimate the most studied motives and understand the linkages existing between them. A database of 72 articles published in research journals was taken from Scopus. To gain a deeper understanding of the strategic motives, the 8 most studied motives were selected and total interpretive structural modelling (TISM) was performed. The scope for this study is limited to the database of papers available on Scopus. For academics, this study provides further insights into the motives for formation of strategic alliance, their interaction and interplay with each other, and interpretation of the relationships between motives. For practitioners, it helps in understanding how and why individual motives impact one another, in order to improve decision making for managers leading firms into alliances.

Keywords – strategic alliances, motives, bibliometric analysis, total interpretive structural modelling (TISM), hierarchical modelling

1. Introduction

Over time, strategic alliances have grown in importance as a means of conducting business operations across country boundaries (Nielson, 2003; Fadol and Sandhu, 2013). The increase in international inter-firm collaboration has been attributed to increased globalization and rapid changes in competitive environment. There is growing emphasis on the use of strategic alliances as a dominant form of business organization pursued both by firms from advanced industrial nations and firms from developing countries (Boateng and Glaister, 2003).

Strategic alliances act as an enabler for knowledge sharing and learning; assist with management of risk; enable firms to address policies of host governments; facilitate entry into new markets; help firms strengthen existing market positions; or help create economies of scale (Glaister and Buckley, 1996; Klijn et al., 2010). While literature on strategic alliances is growing, there is limited understanding of motives with respect to the relationship that exists between them.
Research on formation of strategic alliances has been taking place for over decades; however, there has been critique that there is lack of accumulation of the studies. There are few research papers that have conducted systematic literature reviews in the area of motives for alliance formation.

In this study, we seek to answer certain research questions, which are the most cited and published authors working in the field of motives, which countries have published and cited the most studies in this field, which are the motives that are most researched across the literature of strategic alliances and lastly, what is the hierarchy that exists between these motives and what are the linkages between them.

2. Literature Review

Over the years, a rising number of businesses have entered into new markets across the world; a large number of these organizations have used international strategic alliances as the means to enter these markets (Beamish, 1993; Calantone and Zhao, 2001). While examining strategic motives for alliance formation in developing countries, there were distinct differences found between the relative importance of motives between the home country organizations and their foreign partner; the primary motives of the foreign partners from developed countries were market seeking, whereas for the local partners from developing countries, they were concerned with transfer of technology in order to scale production (Davies et al., 1996; Tatoglu and Glaister, 2000). The motives explored in the literature have been discussed as follows:

2.1 Access to New Markets

Alliances are a quick means of entering a foreign market, helping in rapid expansion of business by utilising the joint resources of the partner companies (Glaister and Buckley, 1996; Tatoglu and Glaister, 2000; Boateng and Glaister, 2003; Nisar et al, 2012, Larimo and Nguyen, 2015). Entering new countries and building a global can be costly and take a lot of time, especially for small and medium sized enterprises; strategic alliances can often be the most attractive means to enter a new market (Boateng and Glaister, 2003; Ulas, 2005).

2.2 Technology Transfer

The primary motivation for organizations in developing nations to form an alliance with organizations in advanced nations is for transfer of technology (Beamish, 1987; Tatoglu and Glaister, 2000). The knowledge of partners, especially when it is complimentary, can be combined for development of new goods and services; existing R&D of a partner company can be utilised by the alliance (Glaister and Buckley, 1996; Tatoglu and Glaister, 2000). However, this is not just a simple transfer of technology or sharing of patents; these contracts are of a long-term duration (Glaister and Buckley, 1996).

2.3 Reduction of Risk

Organizations from developed, primarily Western countries form strategic business alliances in order to reduce business risks (Hamel et al. 1989; Hung, 1994). Large-scale projects can be taken

up along with an alliance partner, as risks are shared (Tatoglu and Glaister, 2000; Boateng and Glaister, 2003; Nisar et al, 2012). The same amount of capital can be invested in a greater number of projects when a firm chooses to form an alliance, as the risk of doing business is reduced (Varadarajan and Cunningham, 1995; Johnson and Houston, 2000; Ulas, 2005;). In alliance agreements where the motivation is sharing of business risk, one partner is responsible for the day-to-day operations of the business; whereas, the other partner takes responsibility for providing capital resources and risk absorption (Mariti and Smiley, 1983).

2.4 Sharing of Costs

An alliance is considered to be useful for reduction of business costs; cost sharing is a vital part of risk reduction as lower costs would result in a lower risk of loss in case of failure of the enterprise (Hagedoorn, 1993; Boateng and Glaister, 2003; Albers et al., 2005). Sharing of costs becomes an important motive for alliance formation when the cost of outsourcing becomes greater than the cost that would be incurred when the same would be internalized (Schmitz et al, 1996; Vaidya, 2004). Shared operations can result in not only lower manufacturing costs, but also lower marketing costs due to shared sales force, joint distribution and/or, joint warehousing (Varadarajan and Cunningham, 1995). The costs savings that are generated can help in quicker payback on investment (Zineldin and Dodourova, 2005; Wigley and Provelengiou, 2011).

2.5 Product Development

Alliances lead to faster development of new products and help progress the improvement of existing products of firms (Zineldin and Dodourova, 2005; Islam et al., 2018). Collaborative relationships between organizations lead to creation of relational rent for instance when two firms jointly produce new products and offer new services (Jones et al., 2010). Strategic alliances comprise complex arrangements that are more contractual in nature than licensing contracts, such as technology sharing or joint development agreements (Henar and Heras, 2012).

2.6 Competitiveness

Greater international competition implies that a firm can no longer remain competitive relaying solely on its internal capabilities (Martínez-Noya and Narula, 2018). Competitive advantages could comprise forestalling competitors, impacting the structure of the industry and consequently, resulting in better competitors (Vaidya, 2004). Additionally, by entering a market and attacking market rivals on their home turfs, a firm can reduce the competitive position of the competitor by distracting their resources and protect their position in their own home market (Varadarajan and Cunningham, 1995; Ulas, 2005)

2.7 Economies of Scale

When resources are pooled together in an alliance, the partners can benefit from sharing resources and be able to bring down the cost per unit of the goods, by learning from each other while being able to avoid the risks that are brought in with a merger (Tatoglu and Glaister, 2000; Boateng and Glaister, 2003, Idris and Tey, 2011). When the motivation to enter into a strategic alliance is economies of scale, the contract can include that one partner shall focus on production of certain parts of the products, whereas the other partner shall focus on production of the rest of the parts (Mariti and Smiley, 1983; Boateng and Glaister, 2003).

2.8 Access to Resources

Strategic alliances allow organizations to fulfill their deficiency of resources (Ulas, 2005). Access to the natural resources present in the host country is a significant location-specific

motive (Dunning, 1992). Resource-seeking motives such as low cost labour and skilled labour as a motive to enter developing economies has been explored; often times, foreign alliance partners enter into an agreement with government organizations, resulting in even lower wage rates (Fahy et al., 1998; Boateng and Glaister, 2003; Idris and Tey, 2011).

3. Methodology

Research on strategic alliance formation has been taking place for over decades; however, there has been critique that there is lack of accumulation for the same. Initially, the methodology that had been set out for analysis in this paper was meta-analysis. The paper would have seeked to review and perform a meta-analysis of the empirical literature on strategic motivation of strategic alliance formation. The initial intention was to analyze motives across empirical research papers in order to identify which factors motivate an organization to collaborate with another, and whether these factors vary across characteristics such as nationality of partner, level of ownership in the strategic alliance, sector of operation, and size of operation. The motives to be included in the research were economies of scale, gaining presence in new geographical markets, to overcome government-mandated barriers, risk and cost sharing and to benefit from low labour cost.

The findings of this research would have been useful for understanding international strategic alliances, for both researchers studying strategic alliance formation and managers planning to enter into strategic alliances. However, after setting out to perform this analysis, it was realized that meta-analysis for this topic was not feasible simply due to lack of empirical data around motives of strategic alliance formation. Even if the topic was stretched to include strategic alliances, there was still not enough data available for analysis. Additionally, it was found that empirical research work conducted in the area of motives for formation of strategic alliances in a majority of research papers was limited to differential statistics: analyzing and discussing which of the motives were most important to the top level management, while entering into strategic alliances. Research papers discussing motives empirically in depth were scanty.

3.1 Bibliometric Analysis

Consequently, the methodology chosen for this study was systematic literature review using bibliometric analysis. Primarily, there are two databases providing bibliometric information for publications in academia, Scopus, which is run by Elsevier; and Web of Science (WoS) which is operated by Clarivate Analytics (Vasconcelos et al., 2015; Dubey et al., 2017; Aref et al., 2018; Mishra et al., 2018). At the outset, data from Web of Science (Core Collection) was considered, as it is used more commonly; however, it was ruled out as it was primarily limited to research work involving science and technology, or research conducted in technology related enterprises. Consequently, Scopus was selected as the database. The scope of the bibliometric analysis was also widened from ‘motives of joint venture formation’ to ‘motives of formation of strategic alliances’, in order to have a sufficient of number of research works in the sample.

The following search command was used (TITLE-ABS-KEY (motive)AND TITLE-ABS-KEY (joint AND venture) OR TITLE-ABS-KEY(strategic AND alliance)) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SUBJAREA , "BUSI")). The scope of this search was restricted to published journal articles (Chabowski, Samiee, and Hult, 2013). Editor notes, conference proceedings, book reviews, as well as books were not included in the analysis. This is

because articles are first reviewed thoroughly before they are published in journals. They are thus considered to be bodies of 'certified knowledge' (Ramos-Rodrígue and Ruíz-Navarro, 2004). The search on Scopus resulted in 131 documents, out of which, 112 were published research papers. After reviewing these 112 research papers, only 72 were found to be relevant papers on the topic of motives for formation of strategic alliances. These papers formed the basis of the bibliometric analysis.

In today's time, research can be carried out more thoroughly and more quickly as hand based techniques have been replaced by modern day computing techniques (Ho and Hartley, 2016). RStudio v1.1.463 was used to compute frequency counts, and analyse the citational data. Furthermore, co-citation analysis was conducted using VOSViewer 1.6.10. (Castro and Frazzon 2017).

3.2 Total Interpretive Structural Modelling (TISM)

In order to further understand the individual motives of alliance formation, the links and the hierarchy between them, total interpretive structural modelling (TISM) was performed on the most common motives across the 72 studies from the Scopus database. For this, all motives analyzed in these studies were first listed out, after which the top 8 most used motives were selected. The steps mentioned in Figure 1 were then followed.

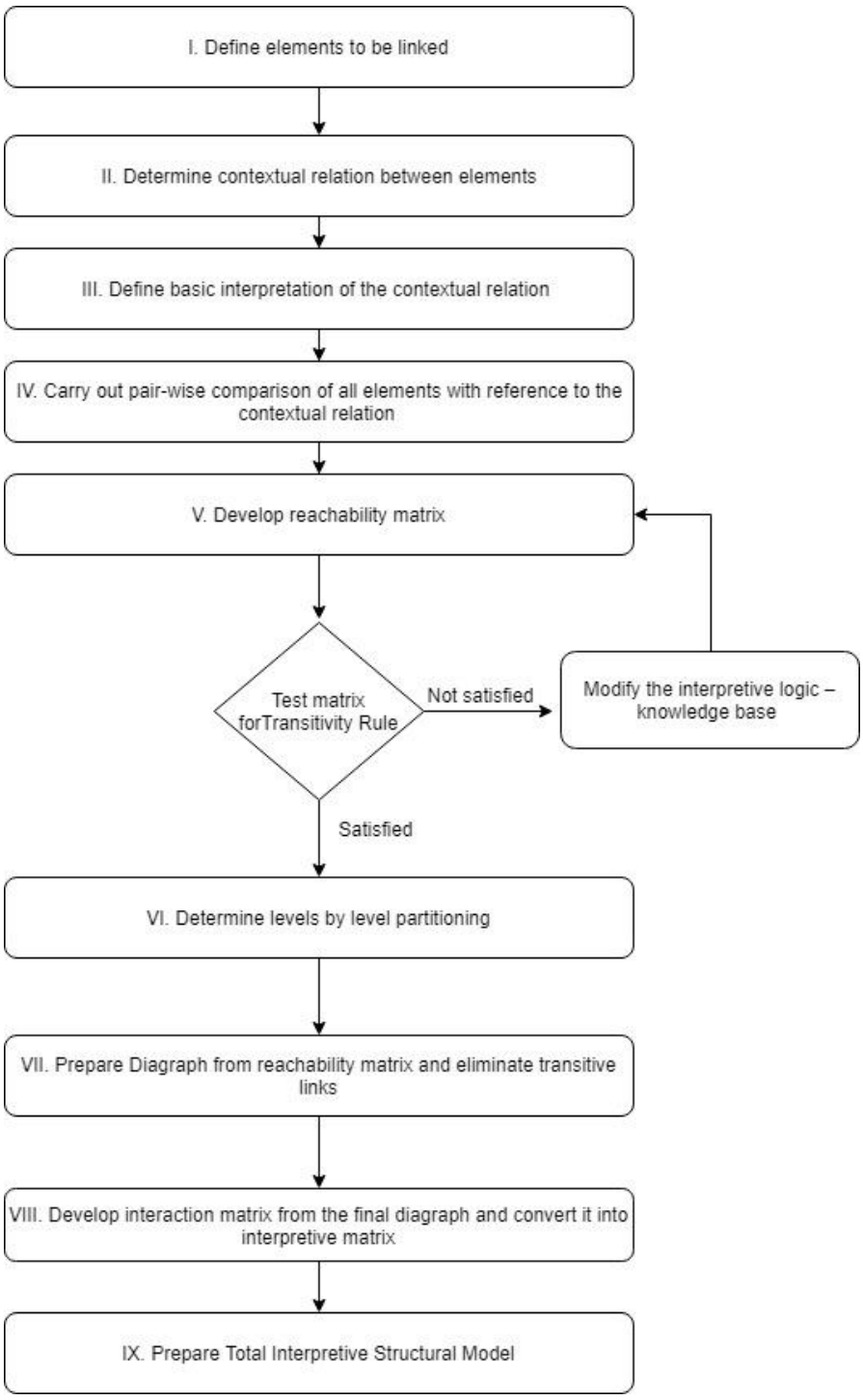

Figure 1 Steps in the process of total interpretive structural modelling

4. Results

4.1 Bibliometric Analysis

Citation Overview

As per Figure 2, we can see that research work in this area was first published in 1985, and has continued to be published till 2018, with a steep fall in number of articles published between 2000 and 2004, followed by the highest number of articles published in a single year, 7, in 2005.

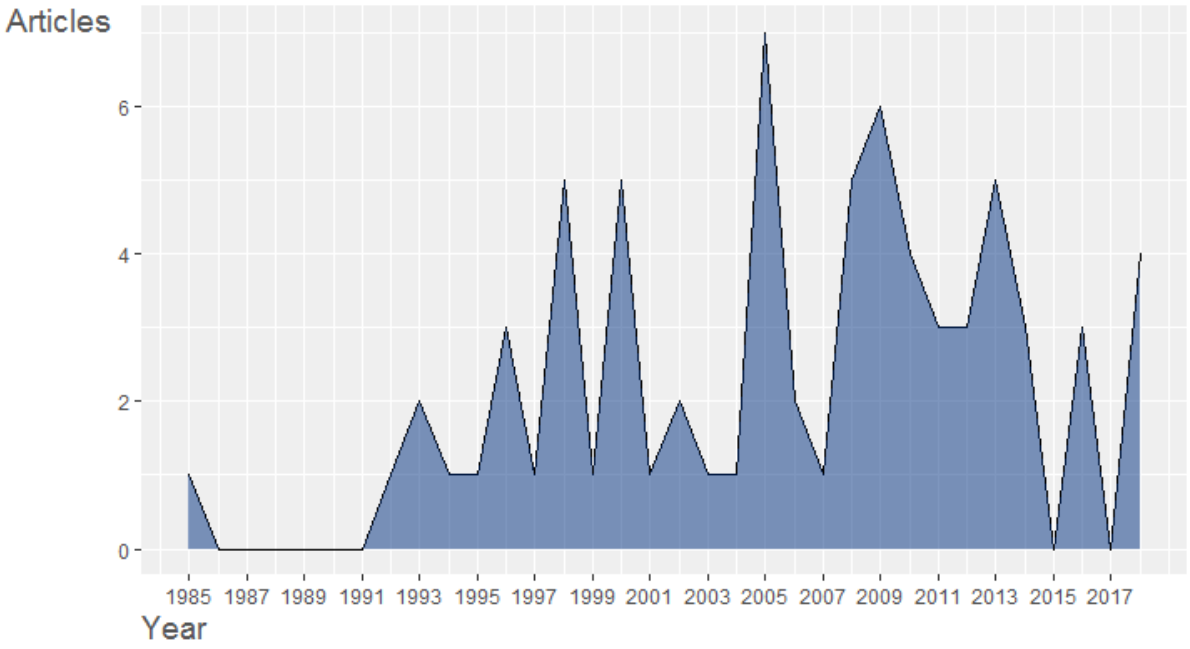

Figure 2: Annual Scientific Production of Articles Published in Journals

Table 1 and Table 2 provide an overview of the most cited publications in journals for this topic. Table 1 provides all-time citation information, whereas Table 2 provides more recent information. The top 10 most cited publications have been authored by 21 scholars. This analysis helps us gain preliminary knowledge into the intellectual framework of the literature. On comparison, we can see that five out of the top ten most cited manuscripts of all time have been published in more recent times.

Table 1: Most Highly Cited Research Articles Published in Journals

Rank	Publication	Source	Total Citations	Total Citations Per Year
1	Hagedoorn(1993)	Strategic Management Journal	1203	48.12
2	Folta (1998)	Strategic Management Journal	342	17.10
3	Varadarajan and Cunningham (1995)	Journal of the Academy of Marketing Science	288	12.52
4	Glaister and Buckley (1996)	Journal of Management Studies	246	11.18
5	Doz, Olk and Ring (2000)	Strategic Management Journal	243	13.50
6	Bayona, García-Marco and Huerta (2001)	Research Policy	213	12.53
7	Burgers, Hill and Kim (1993)	Strategic Management Journal	184	7.36
8	Johnson and Houston (2000)	Journal of Financial and Quantitative Analysis	82	4.56
9	Chen, Farris and Chen (2008)	Journal of International Business Studies	71	7.10
10	Dong and Glaister (2006)	International Business Review	61	5.08

Table 2: Most Highly Cited Research Articles Published in Journals in Recent Times

Rank	Publication	Source	Total Citations
1	Doz, Olk and Ring (2000)	Strategic Management Journal	243
2	Bayona, García-Marco and Huerta (2001)	Research Policy	213
3	Johnson and Houston (2000)	Journal of Financial and Quantitative Analysis	82
4	Chen, Farris and Chen (2008)	Journal of International Business Studies	71
5	Dong and Glaister (2006)	International Business Review	61
6	Nielsen (2003)	European Management Journal	58
7	Boateng and Glaister (2002)	International Business Review	45
8	Sambasivan, Siew-Phaik, Abidin Mohamed and Leong (2013)	International Journal of Production Economics	43
9	Albers, Koch and Ruff (2005)	Journal of Air Transport Management	43
10	Nielsen (2010)	Journal of Business Research	41

Publications from 2000 have been considered for this.

The most productive authors in the area of motives are Keith W. Glaister, Bo Bernhard Nielsen and Ekrem Tatoglu. Glaister has co-authored 7 articles focusing on different aspects of alliance formation motives: motives and partner selection criteria (Tatoglu and Glaister, 2000; Chen and Glaister, 2005; Dong and Glaister, 2006; Klijn, Reuer, Buckley and Glaister, 2010); motives and characteristics such as partner nationality, relative partner size, form of alliance (Glaister and Buckley, 1996; Tatoglu and Glaister, 1998); motives and performance of strategic alliances (Boateng and Glaister, 2002). Nielsen has co-authored 3 manuscripts on the relationship between partner characteristics and motives (Nielsen, 2003; Nielsen and Gudergan, 2012) and alliance formation motives and governance mechanisms (Nielsen, 2010). Tatoglu has also co-authored 3 manuscripts: 2 previously mentioned research papers co-authored with Glaister and another one focusing on the relationship between strategic motivation and nationality of the foreign partner (Tatoglu, 2000).

In Figure 3 we can see the citation links between 19 different countries. Citations came from 26 countries; however, we restricted the minimum number of documents to at least 2, to have a network that shows more relevant links. The top three countries where a large majority (71.9%) of the work was cited were Netherlands, United States and United Kingdom. Incidentally, these were also the countries where the maximum number of manuscripts was published, while not in the same order.

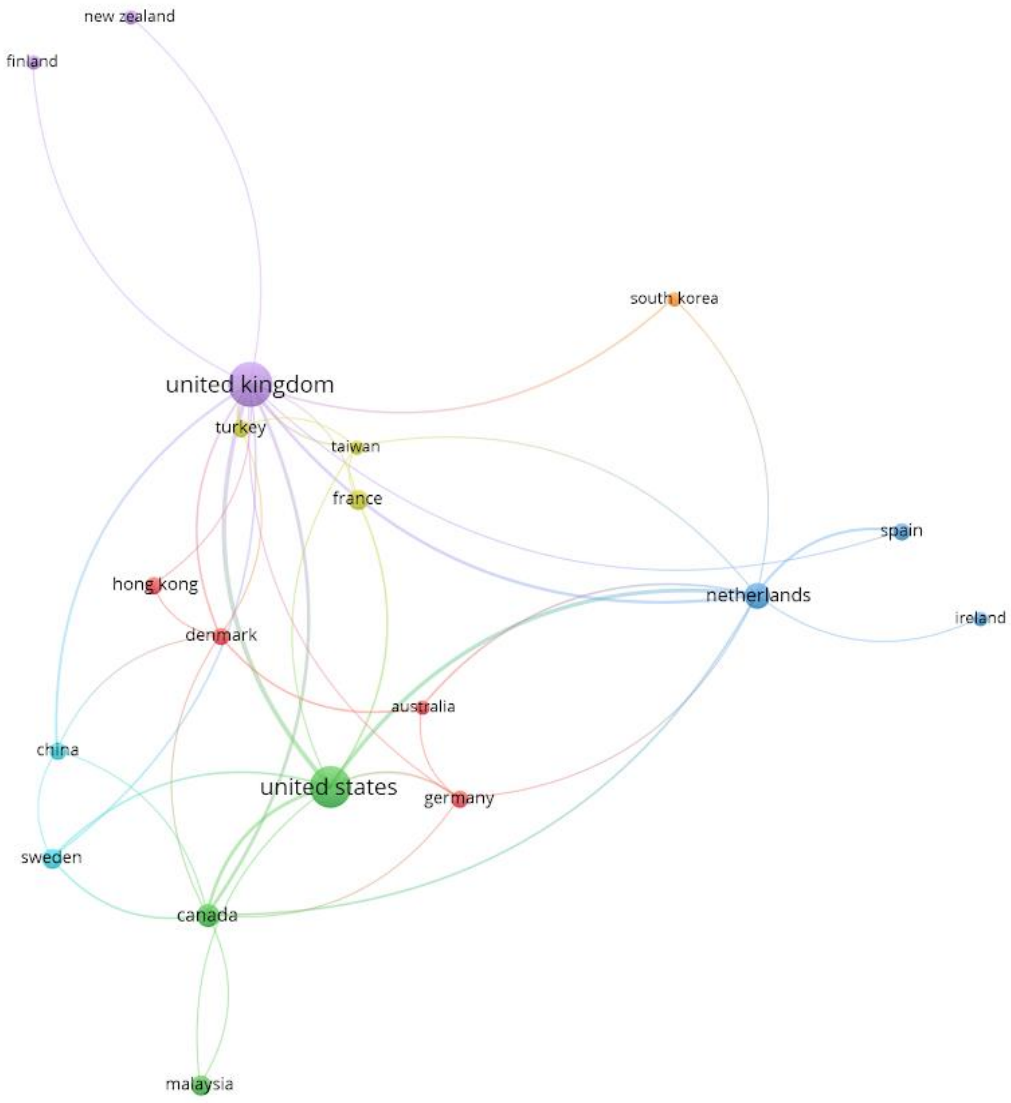

Figure 3: Citation analysis using countries as the unit of analysis

Co-Citation Analysis

Co-citation analysis was conducted using cited references as the unit of analysis. The minimum number of references of a cited reference was taken as 4. Of the total 4056 cited references, 16 references met the threshold. For each of the 16 cited references, the total strength of the co-citation links was calculated. A higher number of co-citations reflect that there is more shared data, and nearer proximity and fewer co-citations reflect that the manuscripts have less in common (See Figure 4).

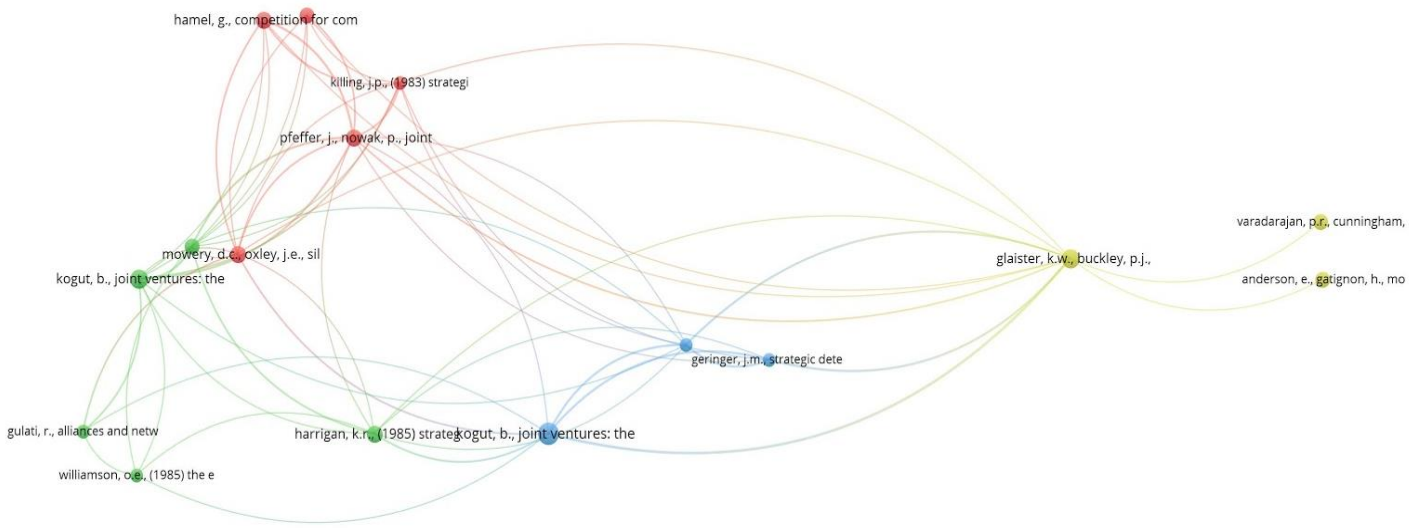

Figure 4: Co-citation analysis using cited references as the unit of analysis

Keyword Analysis

As suggested in Table 3, the most relevant keywords from the literature have been identified. If we filter out the more obvious keywords such as motives, alliances and strategic alliances, we can see which the most widely used keywords in our dataset are. This can help us in understanding where research in the field of motives is headed towards. Relatively more relevant keywords are: **Joint Ventures, International Joint Ventures, Partnership, Performance** and **Strategic Management.** Joint ventures, especially, international joint ventures are a very popular form of strategic alliances, hence these are not unexpected keywords. Performance is a relevant keyword; it indicates that a large part of research on strategic alliance formation and alliance formation motives is focused on the actual performance of the alliance.

Table 3: Most Relevant Keywords in the Data

Number	Author Keywords	Number of Articles
1	Strategic Alliances	18
2	Motives	8
3	Strategic Alliance	7
4	Alliances	6
5	Joint Ventures	6
6	Partnership	5
7	Performance	5
8	International Joint Ventures	4
9	Strategic Management	4

4.2 Total Interpretive Structural Modelling

Keyword analysis from bibliometric data did not result in any conclusive results that indicating towards specific motives. This remained the case even when the number of keywords was extended to 60. As a result, hierarchical modelling of the motives was carried out to understand

the relationship between individual motives. The steps for the hierarchical modelling have been discussed as follows.

Step I: Identify the elements to be linked

The first step would be to identify the elements. The elements can be identified from established theories (for instance, grounded theory), from an understanding of the field, or from past studies (Chauhan et al., 2018; Raut and Gardas, 2018). In this study, the elements have been identified from the literature. The top 8 most studied keywords from the set of the 72 papers have been selected as the elements to be linked (See Table 4).

Table 4: Most Studied Motives in the Data

Number	Motive	Number of Articles
1	Access to new markets	38
2	Technology transfer	29
3	Reduction of risk	25
4	Sharing of Costs	24
5	Product development	21
6	Competitiveness	18
7	Economies of scale	17
8	Access to resources	16

Step II: Define contextual relationship

To develop this structure, the contextual relationships between the different variables have to be defined (Mor et al., 2018; Raut et al., 2018). Here, we define the individual relationships between all the motives, if they exist. For instance, motive 1 influences motive 3, i.e. access to new markets will reduce risk for a business; motive 8 influences motive 5, i,e., as access to resources is gained, new products can be developed using these resources.

Step III: Interpretation of Relationship

This step is considered to be a distinct component of TISM as this gives it an edge over Interpretive Structural Modelling (ISM) by explaining not only the nature of the relationship, but also the cause for which the relationship exists. For instance, how motive 1 influences motive 3 will help in extracting more detailed understanding from the model (Yeravdekar and Behl, 2017; Shukla et al., 2018).

Step IV: Pair-wise Comparisons

An interpretive logic – knowledge base is made in order to facilitate comparison of the elements as pairs. Each comparison has to be responded with either a 'Yes' (Y) or a 'No' (N). For every answer that is Y, an interpretation has to be given for the same. Table 5 shows the interpretive logic – knowledge base (Sindhwani and Malhotra, 2017; Sushil, 2018). For instance, it is checked if motive 7 i.e. economies of scale will affect motive 6 i.e. competitiveness. Since it does have an effect on it, the response would be Y, and a logical explanation would be given for the same, i.e.,

when a firm achieves economies of scale, it is considered to be a high performing organization; high performing organizations are considered to be more competitive than their counterparts.

Table 5: Interpretive logic-knowledge base

Motive	Paired Comparison of Motives	Y/N	Explanation for influence
M1			
M1-M2	Access to new markets will affect technology transfer	N	
M1-M3	Access to new markets will affect reduction of risk	Y	New markets will diversify existing risk
M1-M4	Access to new markets will affect sharing of costs	N	
M1-M5	Access to new markets will affect product development	Y	New markets to cater to
M1-M6	Access to new markets will affect competitiveness	Y	Greater market share
M1-M7	Access to new markets will affect economies of scale	Y	Production will increase
M1-M8	Access to new markets will affect access to resources	N	
M2			
M2-M1	Technology transfer will affect access to new markets	N	
M2-M3	Technology transfer will affect reduction of risk	N	
M2-M4	Technology transfer will affectsharing of costs	Y	Costs of R&D is reduced
M2-M5	Technology transfer will affect product development	Y	New products can be developed using shared technology
M2-M6	Technology transfer will affectcompetitiveness	N	
M2-M7	Technology transfer will affect economies of scale	N	
M2-M8	Technology transfer will affect access to resources	N	
M3			
M3-M1	Reduction of risk will affect access to new markets	N	

Motive	Paired Comparison of Motives	Y/N	Explanation for influence
M3-M2	Reduction of risk will affect technology transfer	N	
M3-M4	Reduction of risk will affect sharing of costs	N	
M3-M5	Reduction of risk will affect product development	N	
M3-M6	Reduction of risk will affect competitiveness	Y	Lower risk makes a business more competitive
M3-M7	Reduction of risk will affect economies of scale	N	
M3-M8	Reduction of risk will affect access to resources	N	
M4			
M4-M1	Sharing of costs will affect access to new market	N	
M4-M2	Sharing of costs will affect technology transfer	N	
M4-M3	Sharing of costs will affect reduction of risk	Y	Lowered costs reduce risk of loss
M4-M5	Sharing of costs will affect product development	N	
M4-M6	Sharing of costs will affect competitiveness	Y	Shared costs imply higher profits
M4-M7	Sharing of costs will affect economies of scale	Y	As costs decrease, economies of scale are achieved
M4-M8	Sharing of costs will affect access to resources	N	
M5			
M5-M1	Product development will affect access to new market	Y	New products can help enter new markets
M5-M2	Product development will affect technology transfer	N	
M5-M3	Product development will affect reduction of risk	Y	New products diversify the existing business
M5-M4	Product development will affect sharing of costs	N	
M5-M6	Product development will affect competitiveness	N	
M5-M7	Product development will affect economies of	N	

Motive	Paired Comparison of Motives	Y/N	Explanation for influence
	scale		
M5-M8	Product development will affect access to resources	N	
M6			
M6-M1	Competitiveness will affect access to new market	N	
M6-M2	Competitiveness will affect technology transfer	N	
M6-M3	Competitiveness will affect reduction of risk	N	
M6-M4	Competitiveness will affect sharing of costs	N	
M6-M5	Competitiveness will affect product development	N	
M6-M7	Competitiveness will affect economies of scale	N	
M6-M8	Competitiveness will affect access to resources	N	
M7			
M7-M1	Economies of scale will affect access to new markets	N	
M7-M2	Economies of scale will affect technology transfer	N	
M7-M3	Economies of scale will affect reduction of risk	N	
M7-M4	Economies of scale will affect sharing of costs	N	
M7-M5	Economies of scale will affect product development	N	
M7-M6	Economies of scale will affect competitiveness	Y	Firms achieving economies of scale are high performing
M7-M8	Economies of scale will affect access to resource	N	
M8			
M8-M1	Access to resources will affect access to new markets	Y	Greater resources can affect production and the capacity to enter new markets
M8-M2	Access to resources will affect technology transfer	N	

Motive	Paired Comparison of Motives	Y/N	Explanation for influence
M8-M3	Access to resources will affect reduction of risk	N	
M8-M4	Access to resources will affect sharing of costs	Y	Costs can be lowered with access to more efficient/cost effective resources
M8-M5	Access to resources will affect product development	Y	New products can be developed using resources
M8-M6	Access to resources will affect competitiveness	Y	Access to resources can improve performance
M8-M7	Access to resources will affect economies of scale	N	

Step V: Construct Reachability Matrix and Check for Possible Transitivity

In order to construct the reachability matrix, for every Y in the knowledge base, we enter 1; and for every N, we enter 0. Once the reachability matrix has been constructed, we check for transitivity, i.e. if M1 affects M2, and M2 affects M3, then this means there is a transitive relationship between M1 and M3. To show the transitivity in the reachability matrix, we replace the 0 with 1*, where the * signifies transitivity.

Table 6 shows the reachability matrix and Table 7 shows the final reachability matrix with transitivity.

Table 6: Reachability Matrix

	M1	M2	M3	M4	M5	M6	M7	M8
M1	1	0	1	0	1	1	1	0
M2	0	1	0	1	1	0	0	0
M3	0	0	1	0	0	1	0	0
M4	0	0	1	1	0	1	1	0
M5	1	0	1	0	1	0	0	0
M6	0	0	0	0	0	1	0	0
M7	0	0	0	0	0	1	1	0
M8	1	0	0	1	1	1	0	1

Table 7: Reachability Matrix with Transitivity

	M1	M2	M3	M4	M5	M6	M7	M8
M1	1	0	1	0	1	1	1	0
M2	1*	1	1*	1	1	1*	1*	0
M3	0	0	1	0	0	1	0	0
M4	0	0	1	1	0	1	1	0
M5	1	0	1	0	1	1*	1*	0

M6	0	0	0	0	0	1	0	0
M7	0	0	0	0	0	1	1	0
M8	1	0	1*	1	1	1	1*	1

Step VI: Level Partitioning

In this step, we estimate the level of each element, to find out its placement in the hierarchy. The element on level one, i.e., at the top, will only have itself, and any other elements at the same level in its reachability set. Similarly, in its antecedent set, it will have itself, any strongly connected subset at the top and all the elements that reach the element from below. Consequently, the intersection between the reachability set and the antecedent set would be the reachability set itself, placing the element at the top level. Subsequently, the top level element is removed and this exercise is repeated until the levels for all elements are established. Tables 4.8-4.11 show the partitioning of the reachability matrix into the various levels, and Table 12 shows the levels of each element in TISM.

Table 8: Partitioning the reachability matrix into level I

Elements	Reachability Set	Antecedent Set	Intersection Set	Level
M1	1,3,5,6,7	1,2,5,8	1,5	
M2	1,2,3,4,5,6,7	2	2	
M3	3,6	1,2,3,4,5,8	3	
M4	3,4,6,7	2,4,8	4	
M5	1,3,5,6,7	1,2,5,8	1,5	
M6	6	1,2,3,4,5,6,7,8	6	I
M7	6,7	1,2,4,5,7,8	7	
M8	1,3,4,5,6,7,8	8	8	

Table 9: Partitioning the reachability matrix into level II

Elements	Reachability Set	Antecedent Set	Intersection Set	Level
M1	1,3,5,7	1,2,5,8	1,5	
M2	1,2,3,4,5,7	2	2	
M3	3	1,2,3,4,5,8	3	II
M4	3,4,7	2,4,8	4	
M5	1,3,5,7	1,2,5,8	1,5	
M7	7	1,2,4,5,7,8	7	II
M8	1,3,4,5,7,8	8	8	

Table 10: Partitioning the reachability matrix into level III

Elements	Reachability Set	Antecedent Set	Intersection Set	Level
M1	1,5	1,2,5,8	1,5	III
M2	1,2,4,5	2	2	
M4	4	2,4,8	4	III
M5	1,5	1,2,5,8	1,5	III
M8	1,4,5,8	8	8	

Table 11: Partitioning the reachability matrix into level IV

Elements	Reachability Set	Antecedent Set	Intersection Set	Level
M2	2	2	2	IV
M8	8	8	8	IV

Table 12: Levels of elements in TISM

Element	Motive	Level in TISM
M6	Competitiveness	I
M3	Reduction of risk	II
M7	Economies of scale	II
M1	Access to new markets	III
M4	Sharing of costs	III
M5	Product development	III
M2	Technology transfer	IV
M8	Access to resources	IV

Step VII: Developing Digraph

The motives are arranged graphically in levels, as shown in the reachability matrix. The transitive relationships may not be included in the initial digraph. Only those transitive relationships that have essential relationships may be retained.

Step VIII: Constructing the Interaction Matrix

All cells with entries 1 are interpreted with the appropriate interpretation from the knowledge base. This final digraph is called the interaction matrix.

Step IX: Total Interpretive Structural Model

The interpretive information from the interaction matrix and the data from the digraph are used to create the Total Interpretive Structural Model (TISM). The interpretations from the cells of the interpretive matrix are entered alongside the links between the motives to show the final model. Both nodes and links are present in the TISM.

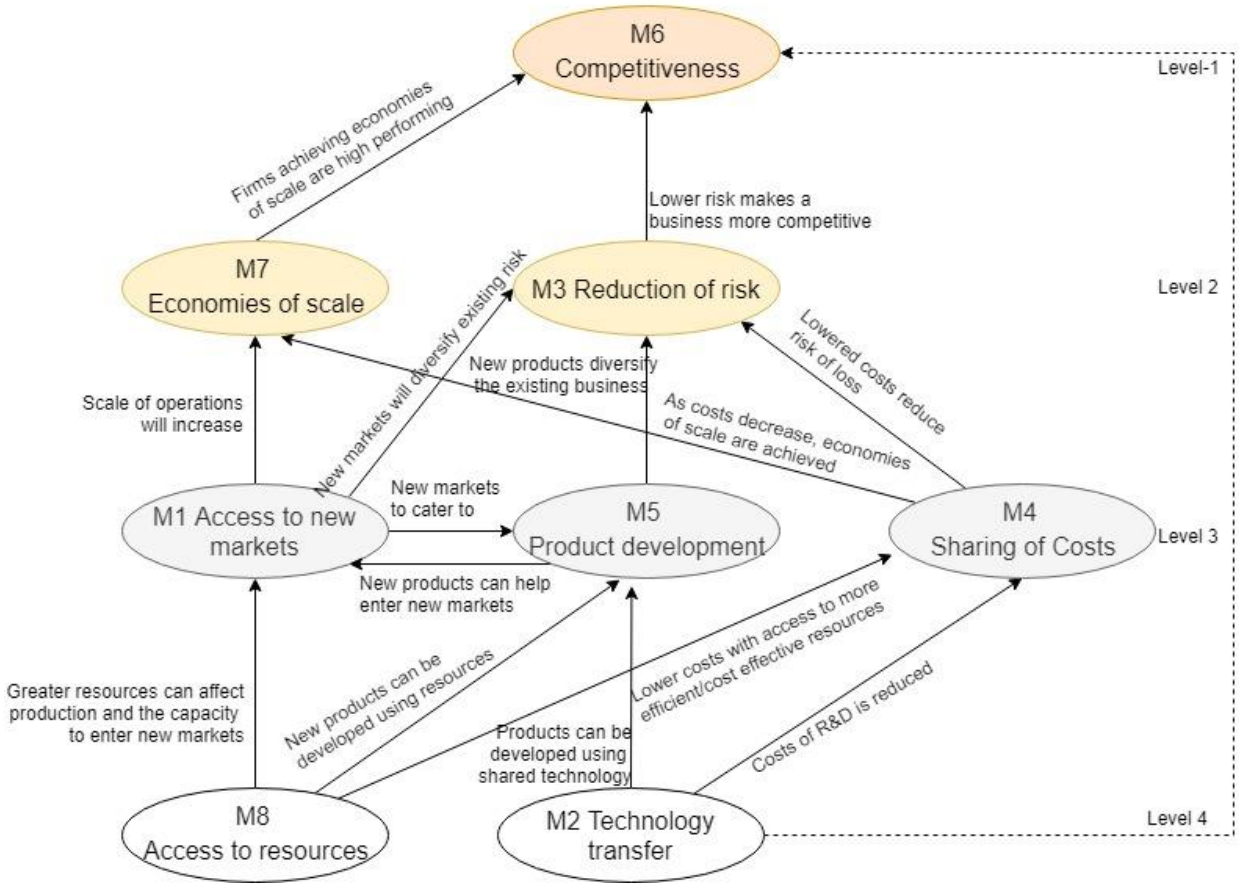

Figure 5 Total Interpretive Structural Model of Motives

5. Discussion

The motives at the bottom of the model are the most important motives for formation of a strategic alliance, from the perspective of an organization (see Figure 5). Access to resources and transfer of technology are the primary reasons for which an organization enters into a strategic alliance. However, these motives have no direct links. From a developing country point of view, transfer of technology is a more important motive, compared to developed countries. These two motives are the leading factors that both affect product development by giving access to materials and resources to the business and the technology to develop new products. Consequently, it can also be said that if the goal of a firm looking to form a strategic alliance is to improve competitiveness, then it should first focus on other motives such as access to resources, sharing of costs, economies of scale and reduction of risk, as these motives lead to competitiveness. Three major paths have been identified in this total interpretive structural model.

5.1 Path 1: Access to resources → Access to new markets → Economies of scale → Competitiveness

Access to resources leads to access to new markets as access to more resources can affect production as well as the capacity to cater to new markets. After a firm gains access to new markets, the scale of operations of the firm would increase; this would directly impact its economies of scale. Firms operating on higher economies of scale are considered higher performing, increasing the competitiveness of the firm.

5.2 Path 2: Transfer of technology → Product development → Reduction of risk → Competitiveness

Secondly, when there is transfer of technology, new products can be created using the shared technology, which leads to development of products. Since new products diversify the product line and as a result, diversify the existing risk level of the organization, this would affect reduction of risk. As a consequence, a firm operating at a lower risk level is considered to have higher competitiveness.

5.3 Path 3: Transfer of technology → Sharing of costs → Reduction of risk → Competitiveness

Finally, the third path identified starts from transfer of technology which leads to shared technology being used by the two firms in the alliance, leading to sharing of costs. As costs are shared, it reduces the risk of losses in case of failure of business, which leads to reduction of risk. In today's environments, a less risky organization is considered to be more competitive than its rivals; hence, reduction of risk directly increases the level of competitiveness of an organization.

For practitioners, the model presents important motives. Sharing of costs in alliances helps an organization reduce the working capital requirements and ultimately reduces the risk incurred by the organization. This can also further increase the ability of the organization to invest in other projects as it frees up financial resources and the risk appetite increases. Achieving economies of scale is also a relevant motive for practitioners as it allows the organization to achieve economies of scale by increasing the scale of operations and reducing costs.

For policy makers, the model presents pertinent motives. Access to resources is relevant for policy makers as it presents opportunities for increased business in the country due to presence

of resources not available in other countries. Resources can be in the form of naturally occurring resources in the country and also availability of lost cost labour or high skilled labour. Access to new markets is also relevant for policy makers as it indicates the motivation for firms to enter a foreign country and helps in growth of the economy of the host country. Technology transfer is also a helpful motivation for policymakers as it allows new technology from more developed economies to enter a host country.

For researchers, the model discusses material motives. Access to resources is relevant as access several distinct resources can be studied; resources can be in the form of raw materials and labour. Sharing of costs is also a material motive as there are several different costs that can studied within this motive: manufacturing costs, sales costs, marketing costs. Another relevant motive is reduction of risk; here, risks can be in the form of business and financial risk.

6. Limitations and Future Scope

There are three major limitations within this project. Firstly, the scope of this research has been limited only to the research papers published in journals that are within the database of Scopus. Research papers that published work in the area of strategic alliances that are not on Scopus, or did not show up using the search queries could not have been included in this study. Books, editor notes, book reviews, conference proceedings, etc. have not been included either.

Secondly, while recently published work has been included in the analysis, the number of citations is not available for them. Hence, while it is possible that these works are fairly important and will be relevant for the future, this information would not be highlighted in this study.

Lastly, VOS viewer was used for co-citation analysis. Alternatively, other tools of network analysis could have been used (Chabowski et al., 2013). A popular method for measuring the same is multi-dimensional scaling (MDS).

In the future, the nature of the alliances studied can restricted to domestic alliances, or it can be a mix of both domestic and international alliances. The study can be done for specific forms of alliances for instance, joint ventures or R&D alliances. This study has been limited to 8 motives; a further study in addition with more motives can also be taken up.

Subsequently, the direction in the relationship between motives could be studied by measuring polarity between them. It was also seen that there have been no longitudinal studies of strategic motives for alliance formation. It is possible that the motives to enter into a strategic alliance change and develop over a period of time. Hence, time series analysis of motives can be an area of research in the future.

7. Conclusion

It has been demonstrated over a period of time that several contributions have been made in the field of motives for formation of strategic alliances primarily from a few number of authors,

published in specific strategy and management journals. Most work done in this field has been in the form of journal articles. There are few books published in this area.

This study includes 72 papers from 53 journals written by 135 authors with 3,755 citations. The key journals within which these research papers were published were International Business Review, European Business Review, Strategic Management Journal, Journal of Business Research and Journal of Global Marketing.

As suggested by the keyword analysis, the most used keywords in the field of motives for formation of strategic alliances were – Joint Ventures, International Joint Ventures, Partnership, Performance, and Strategic Management. Citation analysis suggested that the most productive author in the area of motives is Keith W. Glaister of University of Leeds, followed by Bo Bernhard Nielsen of University of Sydney and Ekrem Tatoglu, of Ibn Haldun University, Istanbul.

The most cited articles of all time have been published by Hagedoorn in 1993, with 1203 citations; Folta in 1998, with 342 citations; followed by Varadarajan and Cunningham in 1995, with 288 citations. Since 2000, the most cited articles have been published by Doz, Olkand Ring in 2000, with 243 citations; followed by Bayona, García-Marco and Huerta in 2001, with 213 citations; and Johnson and Houston in 2000, with 82 citations. The country with the most number of citations is Netherlands with 1241 citations, followed by United States with 1158 citations and United Kingdom with 426 citations.

Taking into account multiple country publications, the countries with the most number of publications is United Kingdom with 11 publications, followed by United States with 10 publications and Netherlands with 5.

This study provided a mechanism to study the relationship between the motives in formation of strategic alliances, using TISM methodology and data from the literature. As a result, we can understand the hierarchical relationship between them. It is argued that access to resources, technology transfer, access to markets, sharing of costs and product development are the motives that lead to competitiveness, reduction of risk and economies of scale.

This study attempts to make a contribution towards increasing the understanding of how and why individual motives impact one another, in order to improve decision making for managers leading firms into alliances. For researchers studying alliances and their formation, this study provides further insights into the strategic motives of alliance formation, the interaction and interplay between these strategic motives, and also, the interpretation of the relationships between them.

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