Towards Business Continuity – A Supplier's View

ABSTRACT

This paper addresses the dynamics of buyer supplier relationships from a supplier’s lens. Psychological Balance theory is used to underpin the dynamics in the aforementioned relationship to draw constructs for a goal-based model towards business continuity. Analytical Hierarchy Process serves as the methodology towards achieving business continuity for a supplier.

Keywords: Buyer Selection; Buyer Supplier Relationships; Analytical Hierarchy Process

1. INTRODUCTION

Sunil Gidumal, a Hong Kong-based entrepreneur, makes tin boxes that Harrods, Marks & Spencer and other retailers use to hold biscuits. Wages, which make up a third of his costs, have doubled in the past four years at his factories in Guangdong, China. “Workers in Sri Lanka may be 35-40% cheaper”, he says, but he finds them less efficient, and finds a better prospective market in China (“Manufacturing,” 2012). The story of Mr. Gidumal is an instantiation of evolving global sourcing strategies, where outsourcing as a cost advantage alone has ceased to exist in today’s flat world. Therefore, rather than only a low-cost approach to supplier selection, modern strategic sourcing counts on suppliers as “local scouts” in a geographical territory that has the potential to expand a buyer’s reach. If that geographical territory happens to be China (population: 1.4 billion people) or India (population: 1.2 billion people), then the supplier suddenly becomes a stakeholder in the buyer’s long-term business plan. This shift in global dynamics is re-shaping the schema of control in buyer-supplier relationships (BSR), begging for an investigation of BSR from a supplier’s lens.
This paper addresses the growing importance of supplier position in BSR. Working with fewer suppliers poses distinct advantages to managing the supply chain – concentrate order volumes, reducing total cost of ownership through better coordination and exchange of information, thereby improving order processing and inventory management, which are both critically volatile in today's global businesses (Ogden, 2006; Sarkar & Mohapatra, 2006; Chen & Paulraj, 2004). In an evolving world where modern sourcing strategies towards supply management are hinting at a handful of suppliers as opposed to a bigger supply base (Eggert & Ulaga, 2010; Larson, Carr, & Dhariwal, 2005; Berger, Gerstenfeld, & Zeng, 2004), the mantel of power in maintaining BSR tends to shift squarely from the buyer towards one of equal opportunity, as opposed to the traditional view of a buyer-centric mode of control. However, while research on BSR with a view from the buyer’s lens is abundant (Chatain, 2011; Li, Xie, Teo, & Peng, 2010; Caniëls & Gelderman, 2007; Kannan & Tan, 2006), the same from a supplier’s viewpoint is scarce, if any. This paper dwells into the dynamics of BSR from a supplier’s lens.

A supplier’s view of business continuity through BSR has rich implications to both theory and practice. First, even though transactional costs for supplier selection are getting lower due to technology, the number of suppliers most companies are working with is shrinking rather than growing. AMR, Chrysler, Ford, Harley-Davidson, IBM, Merck, Motorola, and a host of other companies have successfully conducted supplier reduction schemes in the past couple of decades. Twenty years back, IBM had about 4900 production suppliers. By early 2000, about 85% of IBM’s $17.1 billion in production purchases were with only fifty suppliers (Carbone,
By 2011, about 90% of IBM's spending for production materials was with a handful of twenty suppliers. This change in dynamics was summed up well by Ron Clarke, IBM's vice president of worldwide production procurement sourcing - “All other things being equal, we would source with a supplier who has multiple capabilities and we tell them that. Today, large multinational, sophisticated suppliers are making a lot of research and development investments in their technologies, and we find ourselves increasingly embracing those supplier capabilities and using them in the products we bring to market” (Carbone, 2011). Such instances in practice hint at a gradual trend towards negotiated long-term contracts with a smaller supplier base to produce a “partnering” relationship between the buyer and supplier. As such, the competition for a supplier is getting more complex; therefore, the onus of relationship management is probably as much on the supplier, as it is to the buyer, if not more. A supplier-view of BSR towards business continuity justifies this modal distribution of power.

Second, contemporary literature has often described buyer control as a local fit impressed by the buyer upon the supplier as a mode of effective supply management. As the environment or market conditions keep changing, affiliations have to be correspondingly realigned. Thus, in this pretext, rather than searching for a ‘global’ operational optimum, local optima best serve to accommodate shifting loyalties. Therefore, in an era of shifting supplier loyalties punctuated by relationship specificity, insights into BSR from a supplier’s lens are both timely and relevant.

Third, while research on BSR aims at streamlining supply chain operations by building transparency in information sharing and mitigating the bullwhip effect, a buyer’s view of the relationship is still “downstream” compared to a supplier’s view of the same. Given that
bullwhip effect magnifies upstream, a supplier-view of the relationship could theoretically provide a better platform to mitigate bullwhip effects. *Fourth and finally*, BSR research has often been over-simplified from a buyer’s lens using single-buyer-single-supplier models, therefore disregarding the complexity of dynamics when a supplier supplies to multiple buyers. By using a supplier’s lens, this paper also addresses the dynamics of dealing with multiple buyers.

Looking through a supplier’s lens therefore reveals quite a few interesting perspectives of BSR. For many suppliers, the decision of whether to supply or not to supply may be as simple as identifying the demand for a product. However, with the customer-focused nature of supply management and an increased expectation of personalization and customization, supply decisions no longer come down to “can we meet demand?” Those who manage relationships with buyers must now more than ever treat each buyer individually, and must take under consideration a wide range of influences on the relationship. Some of these influences are quite tangible: can the buyer pay on time? Is the buyer’s order large enough to justify the relationship? Other factors may not be as tangible. For example, what is the nature and extent of relationship between the supplier and buyer? What level of dyadic trust between the two parties help them benefit mutually? Do the firms have a healthy transactional relationship, or is the relationship adversarial? Where in the continuum does the relationship stand? Sub-setting these queries, we ask the overarching question – *how do suppliers decide on buyers to maintain business continuity?* In answering this question, the paper specifically investigates core criteria dimensions that differentiate supplier strategies from choosing one buyer vs. maintaining an efficient frontier of redundant buyers.
The rest of this paper is arranged as follows – section 2 provides the theoretical underpinnings for this study; section 3 introduces the constructs and provides a methodology for the study. Section 4 illustrates the methodology with a numerical example. Finally, section 5 concludes with an eye towards future research.

2. THEORETICAL UNDERPINNINGS

This paper proposes a supplier's view of BSR towards business continuity, rooted in the concept of partnering. Partner selection is influenced by several factors that include knowledge of the firm and firm competencies, which in turn reduces transaction costs associated with search, evaluation, and risk mitigation (Li & Rowley, 2002). Firms also seek partners and are sought as partners when there is complementarity in both resource and capability (Harrison, Hitt, Hoskisson, & Ireland, 2001). Partners are attractive to each other because one has the skills, technological and/or information know-how that the other lacks (i.e. complementarity). At the same time, sufficient similarity is required to be able to mesh one's own operations with the other's (Wilkinson, Young, & Freytag, 2005). Therefore, a supplier's choice of doing business with a buyer is grounded in the right combination of similarities and complementarity leading to a relationship that is more likely to survive and grow, thereby enhancing business continuity. In the light of this balance between similarities and complementarity, we underpin our work on theories of relationship formation and stability based on Heider's balance theory from social psychology (Heider, 1982).

Heider defines “balance” as “a harmonious state, one in which the entities comprising the situation and the feelings about them fit together without stress” (Heider, 1981, p.82). Balance
theory asserts three scenarios of balance between parties. *First*, when relationships between two parties are balanced and positive, they are likely to exist and persist (a case of perfect business continuity). Positivity in relationships is effectuated by proximity of business premises, more frequent contacts, stability of partner's business, and similarity in beliefs, goals, and predilection towards certain sentiments and perceptions of potential benefits (Festinger, 1957). In this context, viewed from a supplier's lens, business continuity can be viewed as largely dependent on a supplier's perceived similarity in a buyer's approach to doing business as well as the buyer's stability in the demand pattern for a product and/or service.

*Second*, when the relationships are balanced and negative, they may or may not continue but will not be under stress to change. Therefore, while balance requires symmetry/reciprocity as evident from the first scenario, it does not require that each side of a relationship exactly mirror the other, therefore constructing a case for balance (and hence business continuity) under complementarity. Negativity in relationships may be attributed to a scenario when goals of a buyer and supplier are alike but mutually incompatible. A particular situation may be one when both parties simultaneously seek to improve performance by maximizing their margins. Under these circumstances, business continuity in BSR when sought from a supplier's lens may be achieved by the supplier's trust in a buyer's reputation at the marketplace.

*Third*, when the relationships are imbalanced, the potential partners will either seek and achieve balance, or will fail in business continuity. In this third case of imbalance, an effort to “seek and achieve balance” largely depends on at least one party's ability to be adaptive and flexible to changes. On this note, business continuity in BSR from a supplier's lens is largely
dependent on the buyer's ability to adapt and flex with supply changes, as well as the buyer's empathy to acknowledge any change in the supplier's business position and structure.

Built on this underlying theory of relationship formation and stability, Table 1 below conceptualizes the connection between balance theory, supplier perceptions and expectations, and the constructs used in the study.

“Insert TABLE 1 approximately here”

The following section discusses in detail the constructs used in a supplier's pursuit towards attaining business continuity. An effort has been made to use constructs as close proxies of supplier perceptions and expectations for business continuity as indicated in Table 1.

3. MODEL CONSTRUCTS AND METHODOLOGY

Technological advancements in recent decades have led to decreased search costs for buyers (Bakos & Brynjolfsson, 1993). These decreased search costs would suggest that buyers would be willing to work with more suppliers; however, evidence suggests that even as costs of finding redundant suppliers decreases, buyers are working with fewer suppliers. Greater efficiency in manufacturing processes has led to dramatic increases in economies of scale, and thus redundancy in the supply chain can not only be created by increasing the number of suppliers available to a buyer (Sheffi, 2007), but can also be created by increasing production volume capability of existing suppliers (Sivakumar & Roy, 2004). With this supply chain structure, buyers are able to further reduce coordination and integration costs by relying on fewer suppliers. Increased competition for a smaller number of suppliers allows the suppliers to be
more selective in relationships that they choose to begin, continue, or even terminate. This greater selectivity increases the number and scope of criteria upon which a supplier values a current or potential business relationship, and a profit or capability-driven model may not fully capture the complexity of the supplier-buyer relationship. Therefore, it is important for suppliers to define their goal (or set of goals) when choosing which business relationships to begin or maintain, and to structure their decision making process in a way to achieve that goal.

3.1. **Model Constructs**

We construct our goal-based model of constraints to address the research question posed in our introduction: *how do suppliers decide on buyers to maintain business continuity?* Taking a view from a supplier’s lens, our research question reflects the following decision goal: choose the buyer (or buyers) with which to maintain business continuity. We have focused on six specific potential constraints based on recent research on BSR viewed from a supplier's lens and our underlying theory as explained in Table 1: a) the degree of similarity between the supplier’s and the buyer’s business philosophies; b) the effects of a change in order size from the buyer to the supplier; c) the size of the potential buyer base in the buyer’s region; d) the buyer’s payment to promise; e) the length of the buyer-supplier relationship; and f) the buyer’s elasticity in the relationship continuum. The following paragraphs discuss each of these constraints in detail.

3.1.1. **Similarity of Business Philosophy.** Stump and Heide (1996) found that specific investments of buyers are positively correlated with qualification of supplier motivation, and also that specific investments of buyers are positively correlated with the specific investments of suppliers
The research shows that when a buyer defines its expectations of the supplier’s motivations within the relationship, the buyer’s initial investment in the relationship is likely to be higher. The same is true when there is a degree of interdependence between the buyer and supplier. Therefore, the first constraint in our goal-based model stems from the fact that in a buyer-supplier relationship, clearly established motivations toward the relationship and an interdependence to achieve similar goals is positively associated with investment from the buyer (this constraint has been coded as IT$_1$ in our model). Additional research on goal congruence by Plank et al. (2007) supports this view, confirming that when buyers and sellers perceive goal congruence, conflict is less likely to be destructive to the buyer-supplier relationship (Plank, Reid, & Newell, 2007).

3.1.2. Change in Order Size. Larson's (1988) “economic transportation quantity” model determines optimal shipping method and quantity, and optimal batch size for suppliers (Larson, 2005). Shipping in optimal batch sizes can help to improve profitability for suppliers and buyers (Jayaraman, Kulkarni, Karale, & Shelokar, 2000), but rounding off orders is a significant cause of the “bullwhip effect” in supply chains (Potter, Towill, & Disney, 2007; Towill, Zhou, & Disney, 2007). Assume a situation where a buyer’s order requirements increase to slightly above one batch level. The buyer must purchase the minimum amount necessary to meet demand or face lost sales due to stock-outs. Therefore, the buyer rounds the order up to the next full batch, and purchases in excess of requirements. For non-perishable items, this means increased holding costs for the buyer, but eventually stocks will deplete to the point where a reorder is necessary. For the supplier, however, rounding off an order distorts the demand for a product. The supplier
must stock enough product to maintain up to the next batch level for the buyer, while at the same
time lengthening the turnover period for its inventory. Thus, even small changes in order size can
have a large impact on a supplier’s profitability (this constraint has been coded as T_3 in our
model).

3.1.3. Size of Buyer Base. By building long-term relationships with a few buyers, a supplier can
gain higher profitability than by having a purely transactional relationship with many buyers
(Walter & Ritter, 2003). Additionally, a smaller buyer base encourages dependence on suppliers
and can “rationalize” a product line (Hald, Cordón, & Vollmann, 2009). Thus, a supplier that
focuses on offering an advantage to the buyers in a smaller market base may find greater
profitability than the supplier that focuses on a large buyer base, therefore making the size of
buyer base a formidable constraint to reckon with in this goal-based model (this constraint has
been coded as T_1 in our model).

3.1.4. Payment to Promise. The importance of “payment to promise,” is rooted in the fulfillment
of contractual payment terms. For a supplier who cannot collect on unpaid debts, the results can
be catastrophic. After leaving the Chinese army in 1982, Huang Shengxin decided to go into
private business as the owner of Changxin Restaurant in Fangchenggang City. Huang and his
restaurant developed a good reputation and received recognition for work, and his restaurant
became a hotspot for local government officials. Unfortunately, by 1997, the County
Government of Tanying owed Huang over 80,000 Yuan, and bureaucracy within the government
prevented Huang from collecting on his receivables. Despite its high praise and popularity,
Huang was forced to close the restaurant (Wei, 1999). This is just one of many examples of a
buyer’s nonpayment having a detrimental effect on a supplier’s business (this constraint has been coded as $T_2$ in our model).

3.1.5. Length of Contract. Length of relationships between buyers and sellers in a transactional setting is governed by the contractual length between the parties.

“Hahn et al. (1983) state that companies will gain benefits by placing a larger volume of business with fewer suppliers using long-term contracts. Furthermore, through a well-developed long-term relationship, a supplier becomes part of a well-managed supply chain and “it will have a lasting effect on the competitiveness of the entire supply chain” (Choi & Hartley, 1996; pp. 333-334).

Shin et al. (2000) examine four performance characteristics of a supply management orientation. Among them is the length of the contract between the buyer and supplier, or the planning horizon of the contract (Shin, Collier, & Wilson, 2000). Therefore, we include contract length as a constraint in our goal-based model (this constraint has been coded as $T_4$).

3.1.6. Position in Relationship Continuum. Hawkins et al. (2008) identify opportunism as a significant factor in reducing trust, commitment, satisfaction and cooperation within buyer-supplier relationship. In studying the effect of opportunism in the buyer-supplier relationship, the authors find a positive correlation between opportunism and levels of dependence and control (Hawkins, Knipper, & Strutton, 2008). That is, the more one party tries to exert control over a dependent party, the greater is the degree to which opportunism may be found. It follows then that higher levels of dependence and control (i.e., less cooperation and mutuality of goals) will
lead to lower trust and satisfaction within buyer-supplier relationships. Yet, an ever-extending supply chain points to a paradox. On the one hand, buyers need to build redundancies in the supply chain with multiple sourcing alternatives, thereby following a formal mode of control with each redundant supplier; on the other hand, buyers need to build lasting relationships with suppliers for continuity in trying times, thereby extending the mantel of control towards the supplier. The question therefore remains: to which end of this control spectrum should buyers and suppliers align themselves to preserve business continuity and yet maintain competitive advantage? As buyers and suppliers juggle between short term ‘multiple sourcing’ and long-term ‘relationship building’, the element of ‘control’ move across a continuum in different degrees, impacting BSR at each degree (this constraint has been coded as IT$_3$).

3.2. Methodology

As competition for suppliers becomes fiercer, and as suppliers continue to compete with buyers for control over the management of their business-to-business relationships, it becomes incumbent upon suppliers to clearly establish and understand the nature of their supplier-buyer relationships. To this end, we will explore the criteria, sub-criteria, and alternatives upon which a supplier might choose to begin or continue a relationship with a potential or current buyer (the goal). In this paper, we suggest the use of Thomas Saaty’s Analytic Hierarchy Process (AHP) (Saaty, 2008) as an appropriate tool for deciding how to achieve the defined goal.

AHP is particularly well-suited for decision problems wherein there is a mix of quantitative and non-quantitative judgments to be made. By its definition, AHP forces the decision maker(s) to explicitly define the goals, criteria and sub-criteria for any decision, and then rank the criteria
and alternatives against each other. AHP offers a significant advantage to a goal-oriented decision making process, where the latter is capable of handling both the objective and subjective dimensions of a decision problem. While objective criteria are easily quantifiable, subjective criteria are often based on the opinions and personal experiences of the decision makers; thus, the relative importance of subjective criteria is difficult to define outside the domain of a decision making process, and difficult to defend at the end. AHP handles this lack of definition by giving numerical weight to subjective ranking. This is particularly helpful when a decision must be made by a committee of subject matter experts (SMEs). By assigning each decision maker’s subjective rank a numerical value, the subjective facets of a decision problem can be integrated with the objective facets into a mathematical model (Saaty, 2008).

In line with the goal of maintaining business continuity from a supplier's lens, we identify two broad sets of criteria, **tangible** and **intangible**, and prioritize them according to a pairwise comparison matrix. Under the **tangible** criterion, we identify four sub-criteria: 1) size of the buyer base in the buyer’s country, 2) promise to payment (contractual payment terms), 3) the effect of a change order volumes, and 4) the length of the contract negotiated between the supplier and buyer. Subordinate to the **intangible** criterion, we identify two sub-criteria: 1) similarities in the business philosophy between the supplier and the buyer, and 2) the buyer’s agreement to change, or the position of the supplier-buyer relationship along the “relationship continuum”. The alternatives in this case would be prospective buyers with which a supplier would consider maintaining business continuity. Using AHP, all priorities for each alternative are
summed and normalized to obtained their global weights, and an alternative is suggested pertaining to a goal decision. A visualize illustration of this model is provided in Figure 1.

“Insert FIGURE 1 approximately here”

4. A Numerical Illustration

The modern restaurant industry provides a good environment to illustrate our concept. While the recent mantra for chefs and owners alike has been “Cook Local,” globalization has opened avenues to more exotic ingredients and expanded growing cycles for many staples to allow for nearly persistent, ubiquitous supply. A line cook in Indiana, USA in winter may be using tomatoes grown in Mexico. A chef in Tokyo may be using white truffles harvested in Northern Italy. Sommeliers in France are seeking out (and finding!) phenomenal wines from unlikely sources, like Australia and Argentina. Global sourcing is an unavoidable element of running a modern restaurant. For both perishable and non-perishable goods, the restaurant market has become a global market, therefore presenting great opportunities for suppliers looking to expand their reach.

Under this aegis, we define a hypothetical US-based supplier seeking to build business continuity with a prospective buyer base. We then identify three hypothetical alternative buyers spaced globally in three continents – one in the US, one in Europe, and the other in South America. Using AHP, we develop a theoretical scenario wherein these three separate buyer alternatives, based in the US, Italy, and Argentina respectively, would be considered candidates as potential buyers for the US based supplier. The criteria and sub-criteria may be prioritized on a
1-9 scale locally through pairwise comparison. This process will yield both the local and global weights for all criteria and sub-criteria presented in Table 2.

“Insert TABLE 2 approximately here”

The three alternatives were then prioritized similarly on a 1-9 pairwise scale in relation to each of the six sub-criteria, $T_1$-$T_4$ and $IT_1$-$IT_2$. By calculating the sum-products of the alternatives' priority for each sub-criteria and the respective weights of the sub-criteria (Table 2), a final priority vector was calculated to rank the three alternatives as illustrated in Table 3.

“Insert TABLE 3 approximately here”

The final vector represents the global weight placed on each alternative toward its priority in the goal decision. When taking these specific criteria under consideration, Argentina achieves the highest rank (0.540), followed by the United States (0.314), and finally Italy (0.146).

5. Conclusion

Buyer-Supplier relationships in this fast, evolving era of global supply chains, are essentially transitory in nature. As such, the mantle of power in BSR is no more fixated at the buyer's end. As new trends and techniques take shape in the arena of supplier relationship management (SRM), there is a renewed interest in the extent of a supplier's role, responsibility, and control in buyer supplier relationships. This paper introduces a goal-based decision model for buyer supplier relationships when viewed from a supplier's lens. In the process, this work looks beyond

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a Please be advised that the pairwise comparisons were created for illustrative purposes of the approach presented in this paper and is not drawn from hard facts.
the tangible criteria of buyer selection towards a goal-based long-term “business continuity”
approach. The modeling approach used in the paper follows the well-acclaimed analytical
hierarchy process (AHP) to illustrate the impact of intangible aspects of business continuity on
buyer selection, in addition to tangible aspects, that have already been quantified in the literature.
By bringing together both tangible and intangible aspects of business continuity, this paper
provides a framework for future direction in this genre of research. The pairwise comparisons
that were hypothetically drawn in this paper need to be empirically validated using global subject
matter experts (GSMEs). Therefore there is enough room to extrapolate from this approach and
future researchers will find this work as a stepping stone towards research on BSR from a
supplier's lens.
### Balance Theory Scenarios

<table>
<thead>
<tr>
<th>Scenario 1: Relationship between the two parties is balanced and positive</th>
<th>From the Supplier's Lens...</th>
<th>Related Constructs Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Supplier's perceived similarity in the buyer's approach of doing business</td>
<td>- Similarities with buyer philosophy (IT₁*)</td>
<td></td>
</tr>
<tr>
<td>- Buyer's stability in demand pattern for goods and/or services</td>
<td>- Change in order size (T₃*)</td>
<td></td>
</tr>
<tr>
<td>Scenario 2: Relationship between the two parties is balanced and negative</td>
<td>- Supplier's trust in buyer reputation at the marketplace</td>
<td>- Size of buyer base (T₁*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Payment to promise (T₂*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Length of contract (T₄*)</td>
</tr>
<tr>
<td>Scenario 3: Relationship between the two parties is imbalanced</td>
<td>- Buyer's ability to adapt and flex with supply changes</td>
<td>- Buyer elasticity in the relationship continuum (IT₂*)</td>
</tr>
<tr>
<td></td>
<td>- Buyer's empathy to acknowledge change in supplier's position and structure</td>
<td></td>
</tr>
</tbody>
</table>

* corresponds to construct labels used in the model

**TABLE 1**: Synchronizing Theory and Model Building
FIGURE 1: AHP and Buyer Selection

<table>
<thead>
<tr>
<th>Hierarchy Level</th>
<th>Criteria</th>
<th>Prioritization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Local</td>
</tr>
<tr>
<td>Goal</td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>Criteria</td>
<td>Tangible</td>
<td>0.750</td>
</tr>
<tr>
<td></td>
<td>Intangible</td>
<td>0.250</td>
</tr>
<tr>
<td>Sub-Criteria</td>
<td>T1: Size of Buyer Base</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>T2: Payment to Promise</td>
<td>0.564</td>
</tr>
<tr>
<td></td>
<td>T3: Change in Order Size</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>T4: Length of Contract</td>
<td>0.264</td>
</tr>
<tr>
<td></td>
<td>IT1: Similarity of Business Philosophy</td>
<td>0.124</td>
</tr>
<tr>
<td></td>
<td>IT2: Position in Relationship Continuum</td>
<td>0.876</td>
</tr>
</tbody>
</table>

TABLE 2: Local and Global Weights of Criteria and Sub-Criteria
<table>
<thead>
<tr>
<th>Alternative</th>
<th>$T_1$</th>
<th>$T_2$</th>
<th>$T_3$</th>
<th>$T_4$</th>
<th>$IT_1$</th>
<th>$IT_2$</th>
<th>Final Vector</th>
</tr>
</thead>
<tbody>
<tr>
<td>B₁ US</td>
<td>0.188</td>
<td>0.188</td>
<td>0.731</td>
<td>0.731</td>
<td>0.637</td>
<td>0.105</td>
<td>0.314</td>
</tr>
<tr>
<td>B₂ Italy</td>
<td>0.081</td>
<td>0.081</td>
<td>0.081</td>
<td>0.188</td>
<td>0.258</td>
<td>0.258</td>
<td>0.146</td>
</tr>
<tr>
<td>B₃ Argentina</td>
<td>0.731</td>
<td>0.731</td>
<td>0.188</td>
<td>0.081</td>
<td>0.105</td>
<td>0.637</td>
<td>0.540</td>
</tr>
</tbody>
</table>

**TABLE 3**: Final Vector for Alternatives

References


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