Exploration of the Gap Problem between Planning and Execution in the Supply Chain - A Case of Taiwan IC Industry

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ABSTRACT

The purpose of this study is to investigate the gap between the planning response goal and the execution outcome in supply chain management. Gaps occur due to the incompetence of supply chain partners in successively responding toward the ever-changing market environment. It is very important to check whether the decision by supply chain partner firms to cut down the level of re-integrated coordination will create an unpredictable risk to the downstream firm. In the real world practice, a firm is apt to take action to reduce the coordination level so as to save the accrued cost. The integrated circuit (IC) manufacturing industry in Taiwan is by no means an exception. Therefore, in this paper we present a case study of Taiwan’s IC industry to justify our argument. It is carried out with a comprehensive survey with the top management personnel in the related area to collect the primary data, and the outcome of the factor analysis and a LISREL analysis toward these data indicates that the reduction in the supply chain partners’ re-integrated coordination level does allow the occurrence of a gap between the planning goal and the execution outcome. Based on our findings a proposal for improvement is presented.

Key words: gap, supply chain management, coordination.

1. INTRODUCTION

In supply chain management, an intimate partner relationship is one of the critical key factors to the creation of competitive advantage, as it can effectively enhance the overall operation efficiency. Corbett, Blackburn and Wassenhove (1999) pointed out that excellent partner relationships can allow the development of market share increase, lower inventory level, enhanced quality, and reduced production cycle. Furthermore, Gentry (1996) also indicated in detail that quality improvement and cost reduction can be achieved through partner cooperation, open communication and effective information exchange. Many relevant research papers have concurred with the viewpoint that partner relationship is quite an important factor in optimizing the supply chain operation.

However, to sustain competitive advantage when facing the ever changing market situation, partners or stakeholders in the supply chain must adapt and respond to a dynamic business environment. Kanter (1992) and Kreitner and Kinicki (2001) presented their viewpoints that firms have to provide a quick

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response to the change in the industry environment. On the other hand, for a firm
the quick response is not a simple course, as partner relationship involves bilateral
communication, coordination and action integration among upper-stream logistics
activities and the management of information flow among many firms. It takes time
and lots of cost in reciprocal communication and re-arranged coordination to seek
for action integration between partners. As a result, dealing with erratically
demands fluctuating in the changing environment, a quick response and integrated
coordination of partner relationship is a matter of priority. Under such a
circumstance, firms will inevitably bear some extra cost. However, many firms are
inclined to take the approach of reducing the coordination level so as to avoid the
undue cost increase.

Nevertheless, previous research on ‘the flexible model of partner relationship’
has indicated that it is a kind of enabling model that solves many problems created
by demand variation (Gardner, Cooper, & Noordewier, 1994; Ganesean, 1994;
Napolitano, 1997). Therefore, the efforts made by the firms to elude cost input may
undermine the long-term partner relationship if every partner unilaterally reduces
the coordination level. The consequence is the erosion of teamwork and it results in
a situation that the requirement of the firm cannot always be satisfactorily fulfilled
by logistics services provided by its partners. For example, the inventory planning
people in the firm cannot obtain further formulation on accurate information from
the partner firm, and the manufacturing/production planning people cannot reach a
consensus on the just-in-time setting. In fact, this situation did occur in the real
world. Day (1995) discovered from the result of a survey conducted on domestic
firms in the U. S. A. that as many as 70% of firms cannot meet the expectation of
their supply chain partners, and the reason is normally due to the partners’
unilateral decision to reduce the coordination level in production planning. The
threat and the risk due to the reduction of the partner coordination level can be
difficult to perceive but can end up with a surprising outcome. Perhaps this is why
till now many firms are not satisfied with their partners, or they are also trapped in
a predicament such that they cannot satisfy their partners.

In fact, this kind of phenomenon has existed in the IC industry in Taiwan for
a long time. Basically, the investment in IC manufacturing facilities is so high that
the firm has to deliberately deal with the varying market demands for IC products.
Facing high operation cost and the necessity to respond to the continuous changes
in market demands, it is natural that supply chain partners have to bear lots of cost
to meet partners’ new demands by conducting re-coordination activities frequently.
As a consequence, in order to avoid the cost burden, firms are inclined to reduce
the level of coordination. Therefore, this study assumes that the decision of this sort
will result in a situation that partners do not satisfy one another and then allow the
development of a gap that deviates from the previously agreed response planning.
Based on this assumption, this research surveys the practices of the IC industry in
Taiwan to validate the existence of these phenomena and makes an appropriate
proposal for improvement.
2. RESEARCH APPROACH

2.1 Literature Review and Hypotheses

The core concept of supply chain management is the integration and the coordination among stakeholders within the value chain, starting from the suppliers and ending with the distributors in the field (Bantham, Celuch, & Kasouf, 2003). In this course, the advantage of a supply chain can be manifested through the exchange among partner firms in the form of business information and other resources (SMMT & DTI, 1994; Hulme, 1997). This is achieved by mutual trust/interest and risk sharing out of partner relationship, and is used to solve many complex problems happening in the business practice.

However, the partner relationship model should be flexible enough to tackle the market demands fluctuation under a dynamic environment. Demand variations incur many issues that are difficult to handle, so that different kinds of resources are taken up within each partner firm. Therefore, the establishment of partner relationship is a must for solving problems in order to meet market demands. For example, Christopher (1992) pointed out that partner relationship in the supply chain could satisfy customer demands through integration and coordination. Sefton (1992) also provided a similar point of view. Furthermore, Rackham (2001) further explained that a coherent supply chain can build a successful partner relationship via the coordination of partners. From researchers’ findings, it can be inferred that partner relationship is by no means a fixed model of cooperation for long, because different patterns of demands have to be satisfied by the particular approach of different partners who respond to the changing demand. Therefore, partners must be involved in the re-coordination acts to adapt themselves to the new demands by appropriate solutions such as strategy cooperation relationships (Bleeke & Ernst, 1991) and temporary relationships (McCutcheon & Stuart, 2000). In other words, because partner relationship is established on different business relationship connection (Rigby & Buchanan, 1994) or established on actions of operation, information, purchasing, and distribution and so on (Buzzell & Ortmeyer, 1995), they will adjust action plans according to the result of partner re-coordination and planning to anticipate the goals of a new demand. Based on the above-mentioned argument, this study provides the following hypotheses.

H1: The re-integrated coordination in response to the demand change is anticipated to do the re-planning

Due to the importance of partner relationship in supply chain management, partner firms should respond fast and should re-coordinate the necessary integration task against any major shift in the market demand, so as to offer an optimized combination of quality, timing, flexibility and cost requirement (Neely, Gregory, & Platts, 1995), which are the well-recognized qualitative or quantitative indicators (Beamon, 1999) for successful supply chain management. However, from partner firms’ viewpoint, the countermeasure against the demand variation always incurs
extra cost. Most firms are reluctant to pay the cost and do without the partner re-coordination. This act leads to a reduction of the integrated coordination level. Actually, partner relationship is established on different business relationship connection (Rigby & Buchanan, 1994) and is established on actions of operation, information, purchasing, distribution and so on (Buzzell & Ortmeyer, 1995). Therefore, these actions will be taken in the re-planning stage. Thus, in the real world, most firms try their best to reduce the re-coordination level to avoid imposed cost due to re-planning and integration. Once the integrated coordination level is reduced, partners may not satisfy one another and thus erode the existing partner relationship. However, the cooperation problem caused by the reduction of the partner coordination level cannot be foreseen in advance. When it happens, a gap emerges between the production planning goal and the actual execution outcome as shown in Figure 1. In Figure 1, P1 is the planning goal in response to the new demand, but P1 can only be achieved as the result of intensive re-coordination efforts. Cutting down the frequency of re-coordination activiteis results in an unsatisfied status E1 and consequently opens the gap between P1 and E1, as indicated in Figure 1.

\[ \text{Figure 1. Gap between planning and execution.} \]

This is the reason why till now the problem of gap still pesters the majority of firms. When Day (1995) conducted an investigation on firms in the U. S. A., he discovered that as many as 70% of firms cannot meet the expectation of partner firms. Most researchers presumed that this is attributable to the reduction in the partner coordination level. Lusch and Brown (1996) clearly pointed out that when partners failed to do the coordination and integration by themselves, the existing partner relationship will be jeopardized. Dwyer, Schurr, and Sejo (1987) suggested that the outcome bring out risk and loss. If firms realized that reducing the re-coordination level will affect the result of the planning goal when responding to the new demand and executing subsequent actions, they would not do so. However,
in the real world, most firms nevertheless reduce the re-coordination level when facing a varying new demand. Here, we will explore whether or not firms foresee the gap problems when they reduce the re-coordination level. Based on the above-mentioned statement, this study provides the following hypotheses:

**H2:** Under the premise of reducing the integrated coordination level by firms, there exists a gap between the adjusted demand planning response goal and result of responding execution.

**H3:** Under the premise of reducing the integrated coordination level, the gap is predictable by the extent of how firms respond towards the new demand.

Therefore, the design of the research structure is based on the system dynamics advocated by Forrest (1961). In addition, the hypotheses in the study are used to establish the structure of this research as shown in Figure 2.

![Figure 2. Research structure.](image)

### 2.2 Methodology and Instrument Design

For the research steps, first of all, factor analysis is conducted to discover the relevant factors in various phases. Second, relevant matrixes are established to locate these factors. Finally, reference is made to relevant matrixes and the linear structure is deduced based on the LISREL method to validate that when the integrated coordination level is reduced, whether a gap is present between the planning goal and the execution outcome when responding toward the varying demand.

The expert survey method is employed for data collection. The instrument design is prepared according to the relationship chart shown in Figure 1. For the first two parts in the questionnaire, reference is made to the perspective mentioned in the course of response in system dynamics. The design of the third part is based
on the findings from relevant professionals and experts to obtain the information about the gap between the planning and execution of the result.

Data collection is done by the approach of person-to-person survey. We interviewed top management personnel in Taiwan IC industry, whose posts in the firm are in the area of supply chain management, manufacturing operation or strategy planning. The sample size should be over 30 (Gay, 1992). Hair, Anderson, Tatham, and Black (1998) opined that in order to conduct factor and relevant linear method analysis, at least 50 effective replies to the questionnaire are needed. Therefore, the number of replies to the questionnaire in this study conforms to the requirement of the research method. With regard to the 50 pieces of reply we received, the answers to the questionnaires were obtained from qualified sources. A pre-test on the questionnaires presented the reliability of the measurement scale in terms of Cronbach’s alpha as high as 0.90 to qualify its robustness for applications. The recovery result shows that the reliability values of the three parts are 0.87, 0.90 and 0.87, respectively, to show that the questionnaire design is appropriate.

3. RESULT

3.1 Data Analysis

With respect to factor analysis, it is necessary to conduct a t-test on them with the KMO (Kaiser Meyer Olkin) and Bartlett Sphere. The purpose of the KMO and Bartlett Sphere check is to ensure the appropriateness of the questions and the analysis result. Generally speaking, a numerical value of the KMO result closer to 1 implies that the Bartlett Sphere check result should be significant. Based on the analysis result we found that, after the deletion of insignificant items to the result of the t-test, the KMO values of the three phases are 0.793, 0.711 and 0.77, respectively. In addition, if Bartlett Sphere checks are all significant, then we conduct the factor analysis and the result is shown in Table 1 through Table 3.

Table 1 indicates the firm’s actions in response to the partner on demands change by partners, including “detecting change and influence dimension,” “changing the model of manufacturing and management,” and “changing the mission of firms in different levels.” These actions are the countermeasures against the changing demand. First, when the demand changes, partners in the supply chain will evaluate the change situation and influence dimensions; then as a result of evaluation, partners in the supply chain will further evaluate the model of manufacturing and management, and decide whether or not to do something to satisfy the new demands. Finally, from the result of changes in the model of manufacturing and management, we assess which partner firms will be influenced by the changed result of manufacturing and management, and oversee what manufacturing and management actions should be taken in these partner firms.
Table 1. Response toward demands change by partner

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor loading</td>
</tr>
<tr>
<td>AF-1: Detect change and influence dimension</td>
<td>Understanding for demand change</td>
</tr>
<tr>
<td></td>
<td>Estimating for partnerships in present situation and new demand</td>
</tr>
<tr>
<td></td>
<td>Estimating for partnerships response ability in present situation and new demand</td>
</tr>
<tr>
<td></td>
<td>Change dimension in demand</td>
</tr>
<tr>
<td>AF-2: Change the model of manufacturing and management</td>
<td>Establishment estimates model for manufacturing and management change</td>
</tr>
<tr>
<td></td>
<td>Managements mission change in different partnerships</td>
</tr>
<tr>
<td></td>
<td>Flexibility response ability change</td>
</tr>
<tr>
<td>AF-3: Change the mission of firms in different level</td>
<td>Planning for performance estimating model</td>
</tr>
<tr>
<td></td>
<td>Planning coordination model for partnerships</td>
</tr>
<tr>
<td></td>
<td>Establishment estimating model for demand change</td>
</tr>
<tr>
<td></td>
<td>Planning missions for different partnership firms</td>
</tr>
</tbody>
</table>

Table 2. Establishing the planning response goal to new demand

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor loading</td>
</tr>
<tr>
<td>BF-1: Goal of coordination in different firms</td>
<td>Best communication</td>
</tr>
<tr>
<td></td>
<td>Fast response</td>
</tr>
<tr>
<td></td>
<td>Low conflict</td>
</tr>
<tr>
<td></td>
<td>Mutualism in benefit</td>
</tr>
<tr>
<td></td>
<td>Low risk sharing</td>
</tr>
<tr>
<td></td>
<td>Best forecast</td>
</tr>
<tr>
<td>BF-2: Goal of operational process in different firms</td>
<td>Flexibility</td>
</tr>
<tr>
<td></td>
<td>Cost</td>
</tr>
<tr>
<td></td>
<td>Response ability</td>
</tr>
<tr>
<td></td>
<td>Operations standardization</td>
</tr>
<tr>
<td></td>
<td>Coordination for production operations</td>
</tr>
<tr>
<td>BF-3: Goal of performance index to profit and loss, resource application</td>
<td>Resource estimates</td>
</tr>
<tr>
<td></td>
<td>Resource allocation</td>
</tr>
</tbody>
</table>

Table 2 indicates three factors in setting up the response plan to respond to new requirement planning, which includes integrated coordination models in different firms, integrated operational processes in different firms, establishing performance index for profit and loss, resource allocation, and the demand to be met. Table 2 indicates which parts in the supply chain should do re-planning and execution to satisfy the new demands. First, to satisfy the new demands, partners in the supply chain will conduct re-planning and re-integration under the model of
cooperation and coordination; this endeavor will influence the operation process. For example, if the previous focus is on cost, then the adjustment in the operation processes may alter the cost structure. When the focus is on delivery, improving delivery practice may help. Finally, because the mode of cooperation and coordination is to tackle the demand fluctuation, the past evaluation model of cooperation and coordination and the operation process are also subject to revision.

Table 3 indicates the gap between planning and execution that will happen if the partner firm wants to avoid the cost of re-integration and coordination against the demand change. Three factors affect the gap between the planning goal and execution, including the “Gap of operation process,” the “Gap of coordination,” and the “Gap of requirement satisfaction in different firms’ goals.”

Based on the result of factor analysis, this research constructs a linear structure. Before this, a relevant matrix between factors is established and the result of which is shown in Table 4. In Table 4, we can find that the correlation between factor A and factor B are significant; the correlation between factor B and factor C also are significant. However, in the correlation between factor A and factor C, Table 4 has shown that most of the factors are not significant.

Table 3. Gap existing between planning goal and execution

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variance</th>
<th>Factor loading</th>
<th>Eigen value</th>
<th>% of variance</th>
<th>Cumulative (%)</th>
<th>Chronbach’s alphas</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF-1: Gap of operation process</td>
<td>Gap between service and product and market expectancy</td>
<td>0.852</td>
<td>4.14</td>
<td>49.044</td>
<td>49.044</td>
<td>0.854</td>
</tr>
<tr>
<td></td>
<td>Model of response can’t achieve market requirement</td>
<td>0.679</td>
<td>14.537</td>
<td>63.581</td>
<td>0.747</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Result of operations standardization can’t achieve market requirement</td>
<td>0.612</td>
<td>12.762</td>
<td>76.343</td>
<td>0.819</td>
<td></td>
</tr>
<tr>
<td>CF-2: Gap of coordination</td>
<td>Partnerships can’t establish common view</td>
<td>0.847</td>
<td>1.308</td>
<td>14.537</td>
<td>63.581</td>
<td>0.747</td>
</tr>
<tr>
<td></td>
<td>Partnerships can’t forecast market requirement</td>
<td>0.761</td>
<td>1.149</td>
<td>12.762</td>
<td>76.343</td>
<td>0.819</td>
</tr>
<tr>
<td></td>
<td>Gap between partnerships and market cognition</td>
<td>0.605</td>
<td>0.821</td>
<td>0.755</td>
<td>0.552</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows the level of correlation between the factors themselves. The SPSS and AMOS software is utilized to conduct an LISREL analysis. By the LISREL structure and the configuration concept, for a model to be valid, the P-value in the chi-square test should justify the hypothesis as statistically insignificant. In other words, some supplementary metrics such as CMIN/d.f. are
necessary. Its value should not exceed 2. All root mean square residuals (RMSR) are preferably as close as possible to 0; the Goodness-of-fit index (GFI) is preferable to be closer to 1; and the adjust-goodness-of-fit index (AGFI) is preferable to approach 1 (Byrne, 1989). We used the SPSS and AMOS software package to conduct an LISREL analysis.

Upon continual revisions, it is found that the result shown in Figure 3 is the optimal model. The linear model shown from the result in Figure 2 is the optimal one as evidenced by the chi-square statistics, \( x^2 = 28.703 \) and \( P\)-value=0.232 > 0.05. As for the other tests, \( \text{CMIN/d.f.}=1.196 < 2, \text{RMSR}=0.001, \text{GFI}=0.893, \text{AGFI}=0.800 \). These results show the appropriateness of the model. Following this, from the observation of the estimate value, the hypotheses in this study are validated.

Table 4. Factor matrix

<table>
<thead>
<tr>
<th></th>
<th>AF-1</th>
<th>AF-2</th>
<th>AF-3</th>
<th>BF-1</th>
<th>BF-2</th>
<th>BF-3</th>
<th>CF-1</th>
<th>CF-2</th>
<th>CF-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF-1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AF-2</td>
<td>.219***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AF-3</td>
<td>.294***</td>
<td>.143*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BF-1</td>
<td>.240***</td>
<td>.129*</td>
<td>.350**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BF-2</td>
<td>.151*</td>
<td>.057</td>
<td>.612**</td>
<td>.518**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BF-3</td>
<td>.364***</td>
<td>.087</td>
<td>.431**</td>
<td>.495**</td>
<td>.696**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF-1</td>
<td>.101</td>
<td>-.040</td>
<td>.130</td>
<td>.382**</td>
<td>.450**</td>
<td>.395**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF-2</td>
<td>.159</td>
<td>.090</td>
<td>.216*</td>
<td>.370*</td>
<td>.552**</td>
<td>.589**</td>
<td>.793**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CF-3</td>
<td>.184*</td>
<td>-.064</td>
<td>.371*</td>
<td>.349</td>
<td>.438**</td>
<td>.414**</td>
<td>.582**</td>
<td>.651**</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note. **Correlation is significant at the .01 level (2-tailed). *Correlation is significant at the .05 level (2-tailed).*

4. DISCUSSION

4.1 For the response toward the newly emerging market demand, re-coordination will be conducted for re-planning and execution

From the literature review and the result of the LISREL test on the H1 mutual effect, it can be inferred that when a newly emerging demand takes place, partner firms will respond towards this newly emerging demand. For cooperation between partners’ productions or relevant operations, re-integration and coordination actions must be conducted among partner firms. In the course of the re-integration and coordination, a re-planning and execution direction will be formulated to respond towards the newly emerging demands and further planning response goal. Therefore the H1 hypothesis is accepted as significant.
4.2 In case of reducing the integrated coordination level, a gap exists between the planning goal and the execution outcomes

The parameter estimate result implies that the response toward newly emerging demands in case of reducing the re-integrated coordination will incur a significant gap. Therefore, it can be known that the H2 hypothesis is also accepted as significant.

The factor result of the second part shows that when facing newly emerging demands, partners will cooperate with one another and conduct re-integration planning to carry out the execution scheme. However, nowadays a majority of firms try to elude the extra cost in performing the re-integrated coordination. Finally, for the execution result of mutual cooperation and production operations, there will still be a gap when compared with the planned response goal result. In other words, under the reduction of the re-integrated coordination activities, any planning response goal may be inadequate, or difficult to be implemented. This can be inferred by the result of H2.

4.3 The correlation of the reduction of re-integrated coordination level in response toward the emerging demand change and gap generation is hard to identify

The parameter estimate result shows that the H3 hypothesis is insignificant. In other words, when the partners reduce the re-integrated coordination level to responses toward the emerging demand change, it is difficult to observe whether there is correlation between the response toward the re-planning execution result and the occurrence of a gap in the future.
The result of this study not only justifies our assumption but also explains the reason why many firms in the IC industry insist on reducing the re-coordinated integration with their partner firms. From the viewpoint of Day (1995) and Lusch and Brown (1996), we clearly understand that when the coordination level of partner relationship is reduced, its initial response actually features correlation with the occurrence of the gap problem. From a pragmatic viewpoint it can be inferred that it is not easy to elucidate what will be the consequence of reducing the re-coordination and integration level, because the decision status of partnership firms is not readily available within a short period of time. The negative effect can only expose itself after a series of incidents. However, the cost problem is different. The reason why partner firms reduce the re-coordinated integration is to elude cost burden. When they reduce the coordination, the cost will decrease accordingly. Therefore, it is not difficult to understand why firms in the real world still reduce the re-coordinated integration level when dealing with their partner firms. Consequently, in the beginning, cost saving is so obvious that they neglect the later advent of a bigger cost problem in the form of gap as shown in Figure 4.

![Figure 4](image_url)

*Figure 4.* The initial period and later period cost direction when reducing the partner re-coordination level.

5. CONCLUSION

The purpose of this study is to investigate the gap between the production planning goal and the execution outcome in supply chain management. Gaps occur due to the incompetence of supply chain partners in continuously responding toward the ever-changing market environment. It is very important to confirm the conjecture that supply chain partners’ decision to cut down the level of re-integrated coordination will bring out an unpredictable risk to the downstream firms. Normally the IC manufacturing industry is by no means an exception. Therefore, we present a case study on Taiwan IC industry to justify our argument.
Partnerships of supply chains should transcend from merely business concern to the relationship of mutual cooperation, depending on the competence of partners’ in coordination and mutual integration. Therefore, when facing demands fluctuation partners in the supply chain should do their best to satisfy the emerging demand through integration and re-coordination. However, for the supply chains of a large organization, re-coordination efforts to resolve the changing demands will inevitably bear some costs. In the real world, according to the outcome of this study, supply chain partners in Taiwan IC industry still reduce the re-coordination level to elude cost of this sort. The reason is that the consequence of reducing the re-coordination level is easy to predict, however, the cost of countermeasures is hard to justify. Therefore, we suggest further research to be in the direction of finding out the best point of trade-off between the benefit of maintaining the re-coordination level and the cost imposed.

REFERENCES


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