

# Internal Market Orientation and Supply Chain Visibility as the Antecedent of New Product Flexibility: Exploring Moderating Impact of Internal Integration

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**Abstract-** Objectives of current study are to examine the impact of Supply Visibility, market orientation and supply chain responsiveness on new product flexibility. Moreover, moderating role of internal integration is being examined in the current study as well. For current research, data collection was done with help of structured questionnaire from the customers of electronic sectors of Indonesia. The response rate of the current study is 53.5% which is significantly higher than the threshold level of 30%. In this research, we used two-step process for analyzing and describing the data analysis outcomes obtained through PLS-SEM. The result indicates that the all path is significant at p-value less than 0.05, and integration appears as a significant moderator. The present study adds on the previous literature regarding under study constructs. The results of the study ensure that improvement in internal market orientation, supply visibility enhances responsiveness in supply chain, which in turn increases the flexibility in new product making. Current study focuses on new product flexibility as an outcome of internal market orientation, supply visibility. While aligning all these supply chain strategies will significantly impact to reduce unnecessary supply chain costs.

**Keywords;** *Internal Market Orientation, Supply Visibility, Supply chain Responsiveness, New Product Flexibility, Internal Integration*

## 1. Introduction

In current market conditions, the customization and variety of products are increasing. Therefore, it is important for organizations to respond to the customers in timely fashion to gain competitive advantage. Across most of the industries like electronics industry, the companies are trying to be responsive and trying to maximize the rate of responsiveness to satisfy the needs of the customers. Moreover, these organizations are also trying to maximize minimize their lead time as well. In recent past the discussion regarding customized products have gone

beyond the variety of products and have moved towards the customized products on the individual bases. A number of electronics organizations have used these strategies like built to order despite the fact that there involves complex operational process in it [1].

Across all industrial sectors, the term responsiveness and concepts related to it are gaining attention. This term is also being used in the research context of supply chain as well. Researchers have used the concept of supply chain responsiveness not as the paradigm of operations whereas, it's been used as important factor or a number of operational strategies including Supply chain management, agility and lean thinking [2]. The pull system which is based on the orientation of customers is also the common example of this which is opposite to production system which is conventional. In order to build the supply chain, responsiveness is the important aspect. Furthermore, researchers have argued that responsiveness of the organizations is also very important to increase the organizational revenue because it brings lean thinking, agility and flexibility. Whereas, in existing literature, most of the scholars have mixed this concept with flexibility. Additionally, there can be multiple goals to achieve supply chain responsiveness which are dependent upon the factors which are related to the market and products [3].

The construct of flexibility is multi-construct. In past literature, researchers have deal it as modification flexibility, expansion flexibility, volume flexibility, process flexibility, NPY, supply chain flexibility, machine flexibility and market flexibility [4]. On the other hand, new product flexibility is the ability of the organization to launch new products or parts and ability to launch along with ability to change the environment. In order to get competitive advantage, it is the main key. The competitive priority and strategic importance can be gained by manufacturing flexibility which organizations must consider gaining competitiveness, responsiveness, cost,

quick delivery and quality. It is because the strategies to improve quality and cost saving cannot be used by the organizations to gain competitive advantage. New products are needed to be developed on the regular basis so these organizations can develop and compete the new markets. Whereas, marketing strategy is combined with operational strategy in the NPF strategy so the competitive advantage can be sustained and improved in short and long run basis. This sustainability is developed by the organizations by addressing the expectations and needs of the customers which are regularly changing. For this reason, the success and survival of the organization, NPF is strategically linked. Especially, when the organization have the ability to prosper in business environment which is uncertain or turbulent [5].

Competitiveness, performance and efficiency of the organization is enhanced through the integration of supply chain. External as well as internal integration is involved in this integration philosophy. Within the internal integration logistic integration, collaboration and coordination is involved along with organizational functional areas. On the other hand, at the level of external integration, integration among suppliers, customers and logistic activities are required [6]. As mentioned in past studies, in order to gain the excellence of supply chain, external strategies play very important role. Therefore, unifying the processes of organization with functions of organizations in the areas of production, demand planning, purchasing, inventory management, transportation and where housing. Cross-functional structures are required by the organizations so the internal operations of the firms can be integrated and integrated as well throughout the relationship of the firm. With the help of appropriate infrastructure, along with team of the work, empowerment and less formalities [7].

The situation of customer dissatisfaction and satisfaction is observed when the customer interacts with the organization and use the products or services of the organization. if the employees of the organizations are not interacting with the customers, the organization will not be able to achieve external customer satisfaction. Employee dealing on the frontline must prioritize to fulfil the basic needs of the customers [8]. Organizations can develop satisfaction among customers by focusing on the work environment in which employees can interact with the customers, the process known as market orientation. Researchers have defined market orientation as the customer set of beliefs which take place as a result of their 1st interaction, in which other stake holders are not excluded like employees, managers and owners so the profitable enterprise can be developed in long run. Through internal market orientation, firms can easily provide value to its internal stakeholders including the employees of the firm. Through internal market orientation, corporate actions and strategies of the firm are

represented which enables the organization to be aligned with the behavior of employee, its services and market [10].

The notion of visibility is invoked through information sharing under the supply chain in which visibility is referred as access of stakeholders towards information in which various factors regarding supply and demand are describes [9]. It's been important to mention that quality of certain type of information which is achieved from the process of sharing the information among all important partners. Therefore, the output of external integration is visibility [11]. The electronics industry sector of Indonesia is continually rising since last decade. 49% of the total sector of Indonesia is producing consumer goods Therefore, it is important for them to keep their lead time short as market is very competitive [12]. For this reason, Objectives of current study are to examine the impact of Supply Visibility, market orientation and supply chain responsiveness on new product flexibility. Moreover, moderating role of internal integration is being examined in the current study as well.

## 2. Literature Review

### 2.1. Supply chain Responsiveness

The ability of supply chain to adapt according to internal and external factors is called as supply chain flexibility. On the other hand, supply chain responsiveness is the potential of supply chain to address issues arising out of marketplace changes. Due to rapidly changing competitive landscape of the globe, Supply chain responsiveness (SCR) has gained crucial attention in creating new opportunities. The flexibility of supply chain plus its response time is now widely known as supply chain responsiveness [13, 35].

As there is a huge diversity in the product variety and increased dynamics of the world marketplace, speedy response to the customer's request is the key competitive advantage in today's global market. A company which is able to respond to short-term demand changes from the market is called as responsive. According to [15] the concomitant delivery of performance and flexibility to the customer is the hallmark of Supply chain responsiveness. In particular, they performed their analysis on a large data set of manufacturing facilities and their results showed that successful companies were the one which were providing both, performance (successful and timely delivery) and flexibility (in terms of product mix and product volume). Studies have proposed that responsiveness is the involuntary consequence of marketplace uncertainty. Research has asserted that companies should be responsive especially when uncertainty penalties are higher [14].

[16] has stated that pioneer studies regarding responsiveness have always considered it as a function of company's internal processes while now scholars are

beginning to realize that more factors and participants are involved in the flow of information and material supply in supply chain and thus, efficient responsiveness can be realized by including other suppliers and customers into integration processes. Hence, literature proposes that the integration of internal and external efforts can have a huge impact on supply chain integration.

## 2.2. Supply chain Responsiveness and New Product Flexibility

Organizations need to adopt flexibility in order to adopt and respond to the current market which is very dynamic. Researchers have mentioned that flexibility is the ability of the organization to adapt according to the requirement of the customers [17] [18].

The flexibility of the product is defined as the ability of the organization to adapt the changes quickly and in efficient manner and the time they need to produce the new product and services. The flexibility of the organization is mainly dependent upon the partners of SC who have to position, produce, test and design the innovativeness of the product as response to the demand of the market. The design which is flexible will reduce the cost of the product and enhance the product performance. A number of products are designed by the product manufacturers which can fulfil the flexible needs of the customers [19].

## 2.3. Internal Integration

The ability of a firm to evolve its structure in terms of practices, processes and behaviors into well-coordinated, organized and synchronized processes to achieve customer satisfaction is called as internal integration [24, 36]. Internal integration employs a number of integrated systems such as enterprise resource planning (ERP), real time monitoring of data and incorporation of effective activities in prioritized areas. It also involves cooperation among different functional areas in order to develop some new technological product or improve an existing process. Internal integration demands that different functional units in the organization should not function as independent entities, rather they should always perform in synchronization. Prior to the concept of supply chain management, organizations relied solely on the integration of internal processes in order to achieve competitive advantage and performance. Systems management theory dictates that in order to achieve excellent performance, every subsystem in an organization must be well integrated (system) [23].

### Internal Integration and Supply chain Responsiveness

According to studies, organizations can improve their competitiveness by gathering, processing, interpreting information and ultimately processing useful information in logical pathways to improve decision making. The

ability of any organization to process information in such a useful way depends on the internal integration of its activities and systems [25]. These cross-functional integrative systems allow an organization to swallow, process and utilize information to perpetuate effective business strategies. Thus, fast and highly sensitive systems enable an organization to adapt rapidly and efficiently to the changing business environment. Numerous empirical studies have been conducted linking supply chain management, flexibility and agility to internal integrative systems. In conclusion, firms having much stronger internal integration among its processes are expected to have higher supply chain flexibility and responsiveness [26].

## 2.4. Internal Market Orientation

IMO deals with the work-related environment of an employee; it includes actions and aspects which are of high value to internal stakeholders of the organization. Internal marketing has long been considered as a classical approach to generate employee behaviors which are oriented towards customer's needs and expectations. It is so that generating such an environment encourages employees who ultimately focus on satisfying customers and their needs [27].

The adoption of IMO results in the development of three key abilities which confers upon a firm to build, assimilate and reorient internal management of employees while managing problems arising from both internal and external business environment [28]. Implementation of IMO allows a firm to reflect upon its existing human resources and associated practices, thus allowing it to redirect them according to the tasks they are supposed to perform or the strategic objectives they have to meet. The first ability which develops is the intelligence development allowing executives to clearly see and understand employees' needs and wants [29]. Second ability is the development of proper communication channels which allow managers to communicate company's policies, their expectations and needs to the employees while at the same time allowing employees to generate their feedback. Third is the ability to respond appropriately to this knowledge, e.g. adjusting employment conditions facilitating employee's needs. This ability empowers employee's belief that company pays attention to their individual needs, generating a positive sense of equity which ultimately leads to higher cognitive alignment of an employee to the company's strategic needs and goals [27].

## 2.5. Internal Market Orientation and Supply chain Responsiveness

There are a number of ways by which organizations can be organized including product category, geographically

and functionally. The boundaries and barriers of organizations impacts the effectivity of the organizations. In order to overcome these barriers processes are designed by the firms by which information can easily be shared through collaboration among all of the departments of the organizations. Functional goals of the organizations are aligned, interdependence within the organization is highlighted and different functions collaborate through internal integration. Grater responsiveness is also enabled through internal integration as well [30].

The findings of the past studies highlighted that organizations can get better results if they invest in technologies that are involved in information sharing along with building capabilities that are related to the process of internal integration. The studies also explained that internal integration can play important role to minimize the uncertainty which impacts the responsiveness of supply chain. A number of different researchers mentioned that this area is important to be explored as it impacts the supply chain capability of the employees [31].

## 2.6. Supply Visibility

Information regarding product or individual components which can be tracked systematically during their transit from manufacturing facility to their final delivery location or to the customer is called as supply chain visibility (SCV) [32].

Researches have proposed that the varying degree of sharing information among partners involved in supply chain is called as transparency. On the other hand, input of huge supply chain data gives an illusion of visibility, however, it is only increasing company's challenge to generate useful insights by matching available information to the strategy. Studies have stated that "visibility for a supply chain is important for accurate and fast delivery of information" [33]. Similarly, it is proposed that, "The lack of accurate information can cause certain negative consequences such as the 'bullwhip-effect' in supply chains"

There are 4 principle constituents of supply chain visibility:

- a) Sensing related visibility
- b) Learning related visibility
- c) Coordination related visibility
- d) Integration related visibility

The first two factors are highly important in shaping opportunities and defining threats while the latter two are important in cashing opportunities [34].

## 2.8. Supply Visibility and Supply chain Responsiveness

Above mentioned literature clearly highlights the importance of supply chain visibility. In order to mitigate

the business environment uncertainty. Whereas, the capability of organization to organize and process the information is enhanced through supply chain visibility. The companies must have the capability to apply and interpret the information according to its own purpose and strategy keeping in view the limitations in terms of resources. If organizations do not have the capability of visibility, organizational goals and objectives can be impacted by a number of different ways. The supply chain visibility will be having minimum impact on the responsiveness of the supply chain if the internal integration is processed with processing the information. Whereas, higher internal integration is achieved if the shared understanding is developed regarding decision makers of the organization which is provided by more supply chain visibility [30]. Hence, internal integration acts as a moderating force on the relationship between the dimensions of supply chain visibility and supply chain responsiveness.

## 2.9. Research Hypotheses

Following hypotheses are developed from the above literature:

H1: Supply chain Responsiveness and New Product Flexibility are in significant relationship to each other.

H2: Internal Market Orientation and Supply chain Responsiveness are significantly related to each other.

H3: Internal Integration moderates the relationship between Internal Market Orientation and Supply chain Responsiveness.

H4: Supply chain Responsiveness mediates the relationship between Internal Market Orientation and New Product Flexibility.

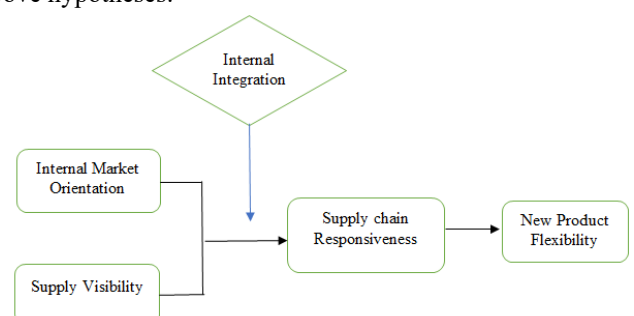
H5: Supply Visibility and Supply chain Responsiveness are significantly related to each other.

H6: Internal Integration moderates the relationship between Supply Visibility and Supply chain Responsiveness.

H7: Supply chain Responsiveness mediates the relationship between Supply Visibility and New Product Flexibility.

## 2.10. Research framework

Following theoretical framework is developed from the above hypotheses:



### 3. Methodology

Smart PLS path-modeling was employed in this research to determine structural and measurement models. The validity and reliability of the constructs were assessed in the measurement model. Subsequently, the structural model was estimated to perform simultaneous regression and bivariate correlation analyses in an effort to establish or determine the correlation among the constructs and the effects of the relationship on the model constructs. PLS algorithm and bootstrapping mechanisms were also applied in this research.

Structural equation models with multiple latent variables and cause and effect relationships can smoothly be estimated through new techniques. According to, SEM is a flexible and powerful tool for predicting and statistical model development. The current study preferred PLS technique over regression, due to superiority of structural equation models in estimation of the mediating or moderating variables. advocated that PLS-SEM is capable of estimating moderation and mediation effects accurately and resolve measurement errors. For real world scenarios, PLS path-modeling is more advantageous and ideal particularly in case of complex model. The PLS technique's soft modeling assumption facilitates in estimating large and complex models, therefore, according to this assumption, PLS can flexibly develop and validate complex models.

Data abnormality issue commonly occurs in most social science studies, although the PLS path modeling does not necessarily requires normal data and can treat non-normal data better as compared to other statistical techniques. Therefore, PLS technique was mainly chosen in this research to avoid data abnormality or efficiently deal with such issue which may occur in current research during the process of data analysis. Data was collected from the customers of electronics sector of Indonesia. Present study shows the response rate of 53.5 percent which is significantly higher than threshold level of 30 percent [35].

### 4. Results

In this research, we used two-step process for analyzing and describing the data analysis outcomes obtained through PLS-SEM. In the first step measurement model is evaluated, followed by the evaluation of structural model in second step.

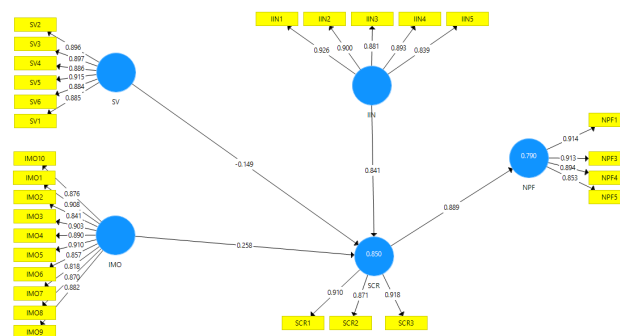


Figure 2. Measurement Model

Second step imply the measurement model examination as a process of observing internal consistency reliability, convergent validity, discriminant validity, content validity and individual item reliability. According to, comparing cross and indicator loadings can help in assessing the discriminant validity. Thus, for sufficient convergent validity, the value of indicator loadings must exceed the cross-loadings.

Table 1. Outer loading

	IIN	IMO	NPF	SCR	SV
IIN1	0.926				
IIN2	0.900				
IIN3	0.881				
IIN4	0.893				
IIN5	0.839				
IMO1		0.908			
IMO10		0.876			
IMO2		0.841			
IMO3		0.903			
IMO4		0.890			
IMO5		0.910			
IMO6		0.857			
IMO7		0.818			
IMO8		0.870			
IMO9		0.882			
NPF1			0.914		
NPF3			0.913		
NPF4			0.894		
NPF5			0.853		
SCR1				0.910	
SCR2				0.871	
SCR3				0.918	
SV2					0.896
SV3					0.897
SV4					0.886
SV5					0.915
SV6					0.884
SV1					0.885

The basic sub-categories of construct validity, these are: the convergent validity and the discriminant validity. The convergent validity tries creating conformity among particular measuring instrument and a theoretical concept. More specifically, the convergent validity confirms if the measurement scales act in line and correspond to the attributes. Thus, factor loadings, average variance extracted (AVE) and composite reliability were

considered in this study following recommendation. Convergent validity establishes, if all the measures that were supposed to measure a specific construct are actually found to be related. Thus, individual as well as cross-loadings are required to be observed for detecting any item related issue and also as an important requirement for establishing adequate convergent validity [22].

**Table 2. Reliability**

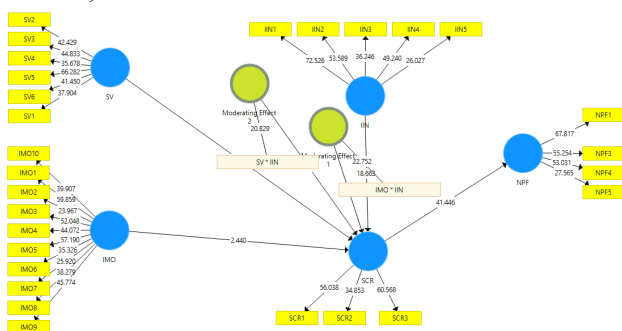
	Cronbach's Alpha	rho_A	CR	(AVE)
IIN	0.933	0.935	0.949	0.789
IMO	0.966	0.968	0.971	0.767
NPF	0.916	0.921	0.941	0.799
SCR	0.883	0.885	0.927	0.810
SV	0.950	0.951	0.960	0.799

Discriminant validity tests whether measures or concepts which are supposed to be unrelated are in fact not related. For further validation of discriminant validity for each construct, the AVE square roots should be calculated. The average variance extracted values were then positioned in a correlational matrix in the diagonal positions. According to, the AVE square roots are expected to be greater than squared correlation estimates for achieving acceptable discriminant validity. Furthermore, the non-diagonal coefficients or elements positioned parallel in columns and rows must not exceed the diagonal elements [21].

**Table 3. Validity**

	IIN	IMO	NPF	SCR	SV
IIN	0.888				
IMO	0.688	0.876			
NPF	0.876	0.716	0.894		
SCR	0.715	0.699	0.889	0.900	
SV	0.691	0.621	0.669	0.669	0.894

Once the measurement model was assessed in current research, the structural model was estimated.



**Figure 3. Structural Model**

For this purpose, a benchmarked bootstrapping process was performed using 5000 sub-samples to analyze the significance of path coefficients to determine the

structural model. Table 4, 5 and figure 3 presents all the structural model estimates as well as moderating and mediating variables involved in the current research. The direct and moderating relationships between and among the variables are shown in the table 4 below. The result indicates that the all path is significant at p-value less than 0.05, and internal integration appears as a significant moderator.

**Table 4. Direct and Moderating affect**

	(O)	(M)	(STDEV)	( O/STDEV )	P Values
IIN -> NPF	0.755	0.746	0.047	16.029	0.000
IIN -> SCR	0.849	0.839	0.045	18.663	0.000
IMO -> NPF	0.221	0.226	0.091	2.429	0.008
IMO -> SCR	0.248	0.254	0.102	2.440	0.007
Moderating Effect 1 -> NPF	0.225	-0.040	0.115	4.219	0.000
Moderating Effect 1 -> SCR	0.228	-0.045	0.130	4.220	0.000
Moderating Effect 2 -> NPF	0.253	0.069	0.116	4.455	0.000
Moderating Effect 2 -> SCR	0.259	0.078	0.130	4.456	0.000
SCR -> NPF	0.889	0.890	0.021	41.446	0.000
SV -> NPF	0.112	-0.107	0.089	4.270	0.000
SV -> SCR	0.126	-0.121	0.099	5.275	0.000

One of the objectives of the current study is to examine the mediating role of SCR in the relationship between the INN and NPF and in the relationship between the IMO and NPF. The results are shown in the table 5. The result indicates that the all the mediating path are significant and positive. The two mediation paths namely IIN -> SCR -> NPF, and IMO -> SCR -> NPF, at the p-value less than 0.05.

**Table 5. Mediation**

	(O)	(M)	(STDEV)	( O/STDEV )	P Values
IIN -> SCR -> NPF	0.755	0.746	0.047	16.029	0.000
IMO -> SCR -> NPF	0.221	0.226	0.091	2.429	0.008

According to and, R-square value acts as a significant criterion for PLS-SEM structural model examination. R-square is also termed as the coefficient of determination. It shows the proportional variation in the endogenous variable that is predictable by the model's exogenous variables [20].



**Table 6.** R-square

	R Square
NPF	0.790
SCR	0.850

## 5. Conclusion

The results of present research verify that internal integration is proved to be a missing linkage to establish how internal market orientation and supply visibility affects responsive supply chain. In simple, by the collection of timely, complete, useful and accurate information of supply chain appear to impact the ability of organizations to respond the changing business environment. In the data set of current study, the positive relationship of internal market orientation and supply visibility with responsive supply chain becomes apparent in the existence of internal integration value.

Hence, the study has found a direct and significant association between supply chain responsiveness and new product flexibility. It implies that a responsive supply chain contributes to enhance the flexibility in the production of new product. Practically, the study shows implication for the managers that new product flexibility is a dynamic competence that empowers the firms to deal with the actions of competitors in the launching of new products and thus, it influences the manager's strategic decisions to exit or enter the new market. Firms should plan and device their marketing and operational strategies for effective and efficient response for the shortening of their product life cycles.

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