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The Value Cycle Model: Understanding the Dynamics of Value Based Management

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There are studies and models to analyze the value chain of a firm. While they are useful in identifying the main activities and drivers of the value creation process in a firm, they seriously lack in explaining the value activities' internal mechanism and linkage dynamics, which generate value, over time. This study attempts to illustrate the internal mechanism and linkage dynamics of a value chain holistically and builds a dynamic theory towards value based management. The main focus of this work is the development of a framework that delivers a value based management mechanism engrossing from dynamic resource-based view of the firm, systemic leverage, balanced performance measures and decision-making perspectives. By way of examples, the concepts underlying the proposed 'the value cycle model' have been elaborated.

1. Introduction

In systemic view, value based management (VBM) is characterized by the proposition that companies and business strategies should be judged by the economic value they can create for all the stakeholders. The decisions have to be made to realize the value. The expanding importance of the dynamic resource-based view of the firm has given a new dimension to value-based management. The accumulation of resources, especially of the intangibles (e.g. employee expertise), plays a vital role in the value creation process of a firm. How does a firm accumulate and where does it deploy the resources in its value chain may significantly impact the value creation potential of the firm over time. The vital link between the decisions and the objectives of the firm is established via value drivers. Value drivers are the operating factors that operationalize the objectives of the firm at the level of actions and decisions that are initiated to create value in a business firm. (Knight, 1997). Not only the identification of value drivers but the understanding of the linkage dynamics among the decisions (being made), the resources (being accumulated and deployed) and the objectives (being realized) is also crucial in managing the value dynamics of a firm. Equally important is the role of performance measures. Performance measures translate to the achievements and measurements of the objectives of the firm. Unless the set of measures capture the dynamics of the systemic inter-relationships present in a firm' value chain, a VBM endeavor may lead to dysfunctional system behaviour. Also, the research findings (Dixon et al., 1990; Fitzgerald, 1991; Kaplan and Norton, 1996; Davis, 1997)

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that recognize the non-financial operating factors as the key determinant of the market share and profitability of a firm, has generated an enormous interest to better understand and manage the value chains of firms.

In sum, the issue is how to manage a value chain in a changing world. We need an integrated framework that effectively addresses the above mentioned challenges in managing the value chain of a firm. Only, then will all the stakeholders be well served, in both the short- and long-term. However, the existing VBM frameworks seem to fail in fulfilling this need. Filling this vital void is the purpose of this article. We present a new model of an integrated VBM that simultaneously addresses the dynamics of value creating linkage structures, the systemic leverage, and balanced performance measures. This model, which we call 'The Value Cycle Model', emphasizes the linkage structures dynamics that exists among the 'decisions', 'resources' and 'objectives' of the firm and the needs over time of the balanced performance measures. The proposed model creates a platform for assessing firm-wide alignment, identifying opportunities for performance improvement and providing leverage for trade-off between the short-term profitability and the long-term growth.

Next in § 2, we cite the literature review, the most relevant to our issue. In section 3, we highlight the likely characteristics of the solution model. The Value Cycle Model is described in § 4. Here, also, the use of model by way of an example is illustrated. Finally, in section 5, the conclusion of this study is presented.

2. Literature Review

In general, an enormous amount of work has been accomplished in the area of value based management together with a great deal of literature on the related area of performance measurement. In the following sections, we provide a brief account of work that is most relevant to our research issue "understanding the dynamics of a value based management". Towards this end, we have identified following three main research streams:

i- Value Based Management
ii- Performance Measurement
iii- Value Cycles and Systemic Leverage

2.1 Value Based Management

Value based management has witnessed a phenomenal growth in recent times (Keeney, 1992; McTaggart et al., 1994; Knight, 1997). The most convincing and systematic approach towards VBM is the work by Knight (1997) who proposes VBM as a solution to the problems of a firm' management created by the conflicting signals and confusing priorities ever present in the decision-making environment. He terms VBM as a link between strategy and financial results and divides the topic of value management into five elements: goal, strategy, measures, processes, and decision. This model suggests an integration of VBM elements via a pyramid scheme, where at the base resides the 'operating decisions' then followed by 'corporate processes', 'measures', 'strategy' and then comes the 'goal' at the top. Though Knight's model provides a useful descriptive framework for VBM but does not explain the linkages dynamics between the VBM elements. The suggested link between decisions, processes and goals appears

to be sequential. While decision/consequence/information is essentially a feedback process (Sterman, 1994), the linkages within the VBM elements are treated as linear and static in Knight's model.

VBM literature in general and Knight's framework in particular, fail to capture the time pattern of resource accumulation (Dierickx and Cool 1989; Warren, 1997) that greatly influences the value dynamics in a firm (Morecroft, 1985 and 1997). Resource-based theory begins with the notion of resource heterogeneity and argues that this resource heterogeneity is responsible for observed variability in financial returns across firms (Barney, 1986; Peteraf, 1993). Therefore, it seems imperative to include resource accumulation dimension in the VBM model.

2.2 Performance Measurement

Performance measurement is a key factor in ensuring the successful implementation of a firm strategy (Fitzgerald et al., 1991). Obviously, this translates to the achievements and measurements of the objectives of a firm. Value generating activities of the firm such as the inbound logistics, operations and outbound logistics are meant to realize the objectives of the firm by lowering the cost and /or product differentiation and hence there is a need to measure the performance of these values generating activities. Traditionally, the financial performance measures such as ROE, ROI, EPS have been used as a measure of the performance (Hergert and Morris, 1989; Stewart, 1990; Davis, 1997). These financial measures often tend to focus on short-term profitability (Disxon et al, 1990; Fitzgerald et al., 1991). Too much emphasis on managing by the financial numbers may threaten the firms' long-term viability (Kaplan, 1984). The excessive focus on short-term profits often creates dysfunctional effects on quality and fails to capture the competitive performance (Hegert and Morris, 1989; Fitzgerald et al., 1991). To overcome these shortcomings of the traditional financial performance measures, Fitzgerald et al. (1991) suggested some generic performance dimensions including both financial as well as non-financial perspectives and a simple input-process-output model for performance measurement. Though a step forward in performance measurement but Fitzgerald et al.'s (1991) model is essentially a static model and fails to capture the systemic inter-relationships present in a firms' value chain. Both lead and lag indicators are present and are linked through the chains of inter-relationships of a value chain. These lead and lag indicators, in turn impact the firms' performance. The Balanced Scorecard (BSC) methodology (Kaplan and Norton, 1996) has witnessed a wide acceptance in the private sector, for strategic management of the businesses (Slopper et al., 1999). However, a BSC model, also fails to capture the dynamics of inter-related variables in a firms value chain. Instead, the simplistic assumptions are made about the value chain structures. Impact of feedback, time delays and non-linear relationships among the system's variables is often not recognized. Consequently, the performance measures may not align to the objectives of the firm. There is a need for performance measures that:

(i) capture the dynamics of inter-related variables and structures of a firms' value chain;
(ii) ensure the consistent and aligned measurement of the goals of a value chain of the firm.

2.3 Value Cycles, Systemic Leverage and Decisions Integration

Decisions are the results of some decision rules or policy to information about the real world as we perceive it (Forrester, 1961). Essentially, a decision is made to achieve some goal.

The decision makers compare quantitative and qualitative information about the state of real world to various goal, perceive the gaps between target and actual states, and take actions that (they believe will) cause the real world to move towards the target state (Sterman, 1994). This information/action/consequence cycle creates value by bringing the state of the system closer to the goals, over time. This cycle is termed as a value cycle (Wholstenholme and Stevenson, 1999). A generic value cycle is shown in Fig. 1. Value cycles are the functions or the processes responsible for value creation (destruction) over time. The linkage structure of various value cycles of the firm reflects how to align or relate division of resources with each other (Morita, 1997). The identification of policy intervention points is vital for effective resource alignment. Systemic leverage (Senge, 1990; Ritchie-Dunham, 1999) effectively helps in policy levers identification. To leverage in a firm is to control system resources efficiently, effectively, and sustainability (Ritchie-Dunham, 1999). According to Ritchie-Dunham, at any given time, a firm' s systemic leverage (SL) consists of three components namely, SL's direct, dynamic, and structural components corresponding to (i) people's actions, (ii) goals that drive actions and (iii) multiple goals that interrelate in a system, respectively. Direct leverage involves no value cycles. Action and result are close in space and time. Using direct leverage is most appropriate for local, short-term resource changes that do not trigger potential systemic effects (Ritchie-Dunham, 1999).

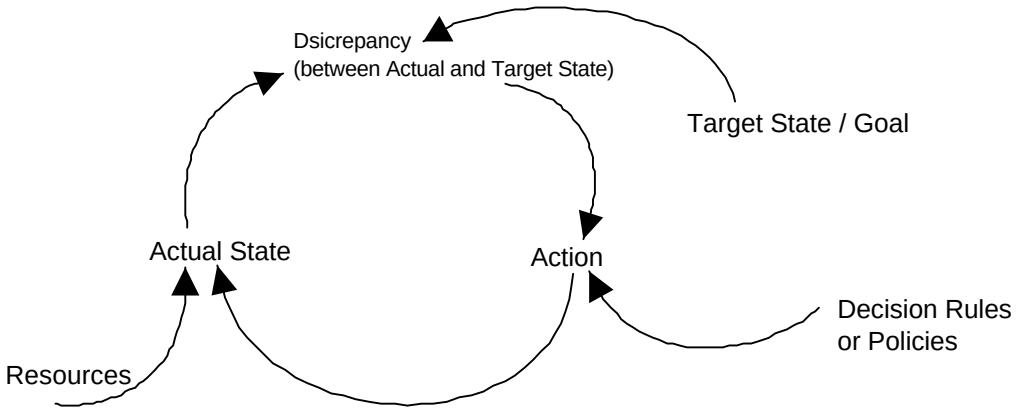

Fig. 1: A Generic Value Cycle

Whereas, a value cycle and hence the value cycles linkage structures involve information-action-consequence chains that create the dynamic complexity. Dynamic complexity often leads to poor decisions and causes dysfunctional systems behavior (Sterman, 1989; Forrester, 1995; Doerner, 1980). In other words, the firm's sub-goals are not explicitly realized and aligned to the global goal. Equally problematic are firms' resource dynamics. In the value creation process, together with goals and policies, firms' resources play a vital role (Wernerfelt, 1984; Porter, 1985; Foss, 1997). Especially, the dynamic resource-based perspective (Dierickx and Cool 1989; Warren, 1997) identifies the pattern of resource accumulation in a firm as a key signal to firms' value dynamics (Morecroft, 1985 and 1997). A value cycle explicitly links the local goals, decisions and resources. As a result, value cycle linkage structures in firms' value chain capture the pattern of firms' resource accumulation through its nested and interrelated chains of value cycles. Besides the identification and establishment of the value cycles linkage

structures, decisions-makers need some operational measure to gauge the value creation potential of sub-systems' value cycles as well as of the whole systems' linkage structures. Both dynamic and structural component of leverage seems to fill this vital gap effectively. Dynamic leverage enables decision-makers to realize the goals in a value cycle efficiently. While structural leverage provides an assessment and guidance to align the sub-system/ value cycle goals with the overall system goal.

In each value cycles linkage structure, according to Ritchie-Dunham, after n time periods, decision D_n produce result R_n, obtained through the dynamic leverage multiplier λ_{dyn} :

$R_n = \lambda_{dyn} \times D_n$,

where: $\lambda_{dyn} = \left| \frac{ActualGain}{Target Gain - ActualGain} \right|$

The above equation shows how well a value cycle attains its target goal. The dynamic leverage provides an operational measure for the decision variable (i.e., D_n), where as the term "gain" tracks the changes in the performance variable (i.e., R_n), over the n-period information feedback loop. Thus, through the value cycles constructs, the operationalized feedback loops are identified in the value chain. These loops describe explicitly the relationships between the goals/ sub-goals of the firm and the decision rules or policies articulated by the decision-makers.

VBM aims at integrating and aligning the sub-system goals in a value chain with the global goal of the entire value chain. Achieving such an integration requires that all the sub-system goals work together to achieve the overall system goal (Porter, 1985). The identification of both the actual and the stated goals and sub-system goals is an essential prerequisite for sub-system goals alignment (Argyris, 1993). In a value chain of a firm, according to Ritchie-Dunham the result R_n, which stated system goals accomplish after n time periods, depends both on the actual goals underlying decision D_n and the structural leverage multiplier λ_{stt}:

$R_n = \lambda_{stt} \times D_n$,

where: $\lambda_{stt} = \left| \frac{Gstated,n}{Gactual,n - Gstated,n} \right|$

The above formulation shows how well the system as a whole attains its global goal. In other words, structural leverage provides an operational measure of the relative goal alignment. Therefore, with the help of dynamic and structural leverage, the conflicting goals in a value chain are identified and possibly aligned. Thus, value chain linkage structures facilitate the logical and consistent linking of interconnected decisions in a value chain. The successful value creator firms have focused on improving decision- making (Knight, 1997). Value cycles and the linkage structures' perspective provides the weighing scale to help decision-makers balance different considerations and come to decisions that create higher value for the firm. Moreover, the increased number of alternatives under consideration, availability of both dynamic and structural leverage and improved information via feedback will improve the decision making. Thus, the decisions in a value chain are integrated via value cycles linkage structures and thereby the firms' value creation potential is enhanced.

3. Characteristics of a Likely Solution Model

Based on the assessment, presented in the previous section, of the value based management frameworks, we ask: 'What are the key ingredients of a model that would promote an effective value based management in a changing world?' We suggest with the following general characteristics:

- that the model should be able to guide the managers to integrate strategic decision making with operational performance;
- that it should engross the dynamic resource-based view of the firm to let the management understand the resource accumulation dynamics which are critical to the value creation process of a firm.
- that the new model should encompass the balanced performance measures to provide management the leverage for trade-off between the short-term profitability and the long-term growth.
- that the proposed model should have a dynamic and structural mechanism that would help management identify and align the conflicting goals in a value chain, balance different alternatives under considerations and come to the decisions that create higher value for the firm, both in short- and long-term.

Next we present the model that adequately embodies these characteristics. Together, we will illustrate, by way of an example, how the model helps management to deal with the dynamics of VBM.

4. The Value Cycle Model

The preceding sections lead to the framework reflecting a dynamic view of value based management as shown in a schematic form in Fig.2. We call this framework 'The Value Cycle Model. The proposed model is different from other studies in the literature (Dixon et al., 1990; Fitzgerald 1991; McTaggart 1994; Knight, 1997; Scott, 1998) that primarily have focus on the "linear linkages" and the "static view" of VBM. In our view, the process of and inquiry into VBM must center on "cause-and-effect relationships" and the "information feedback loop" that exist among the decisions, resources and goals of the firm. Here, we define the value cycle model as a method for managing value flow from dynamic resource-based and operational performance perspectives by achieving the firm's decisions integration, over time.

The model has three core elements: linkage structures, resources, and performance measures and leverage. The value cycles linkage structures, provide firm-wide integration of goals, resources and decisions: the first requirement of the solution model. The inter-related and nested feedback loops effectively capture the resource accumulation process: the second critical specification for the model. . The third core element is the balanced performance measures and leverage. The balanced performance measures tied in the linkage structures, provide management the measurement scale that facilitates the trade-off between short- and long-term value creating opportunities: the fulfillment of the third characteristic. With the help of direct,

dynamic and structural leverage, management is aided for assessing the firm wide alignment and identifying opportunities for performance improvement, thus satisfying the fourth design criteria.

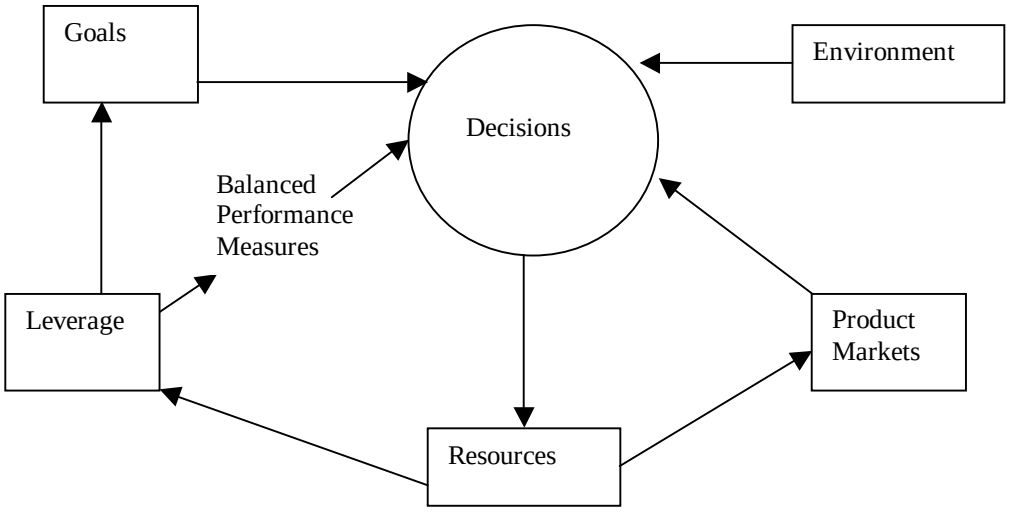

Fig. 2: The Value Cycle Model

4.1 Case Example

We illustrate the proposed framework for dynamic VBM and the concepts used by way of an example. A Production-Sales model of a vertically-integrated retail food and manufacturing (bakery) firm is exclusive adopted from Roberts et al. (1981). The Retail food and Manufacturing divisions of the firm account for sales of several hundred million dollars. The stated goal of the firm showed that two sub-system actor goals composed its stated profit maximization goal: sales and production. The Retail Division's performance is measured in terms of both sales volume and profitability. More specifically, performance is compared with a monthly dollar sales target and desired retail gross margin percentage. As the Retail Division is Manufacturing's sole customer, performance of the manufacturing division is measured almost exclusively in terms of profitability. Specifically, the Division's income contribution has been used as its principal performance measure. Now we apply the value cycle model to assess the firm's overall alignment and the leverage available to help management exercise trade-off between the short-term profitability and long-term growth of the firm.

Step 1: Identify the Firm's Value Cycles and Linkage Structures

By applying the causal loop diagramming method of system dynamics approach, the firm's value cycles are identified and shown in Fig. 3.

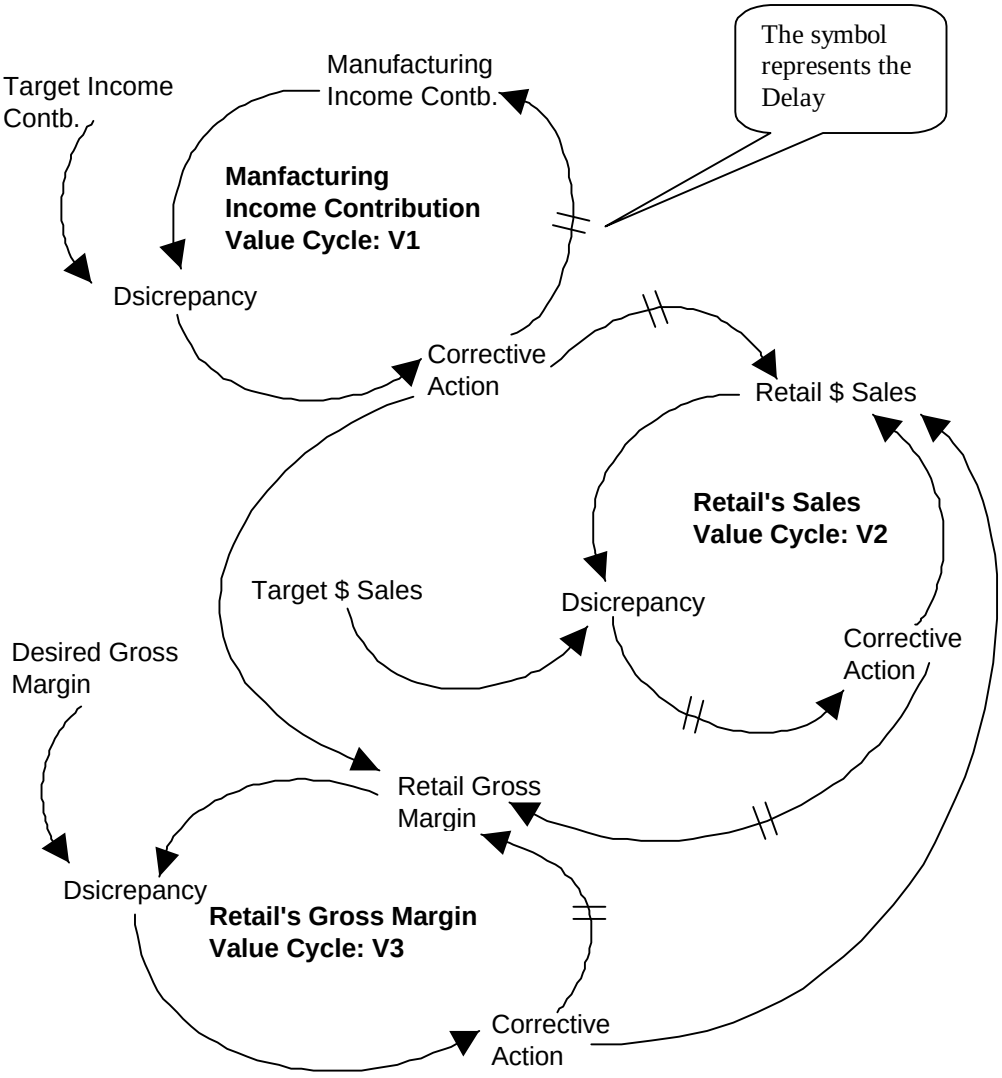

Fig. 3: The Firm's Value Cycles

Step 2: Assess the Degree of Alignment across the Value Cycles Linkage Structures

By tracing along the path of each value cycles linkage structures, identified in step 1, we perform the preliminary assessment of goal alignment. The first value cycle V_1 represents the value creation process of the Manufacturing Division whose local goal is to match with the target income contribution. In response to correct an unfavorable income contribution discrepancy, Manufacturing attempts corrective action. It ships more to the stores than was ordered and tries to stimulate more aggressive sales promotion at Retail by offering lower transfer prices. Overshipments result in increased "reduction" of prices at the stores. The immediate outcome of

these reductions is a drop in the gross margin percentage thereby causing Retail to be more conservative in its allocations to stores. Because of low transfer prices, Manufacturing income contribution falls even further than before. We see that it is the value cycles linkage structure that helps trace the impact of decisions in value cycle V_1 on the value creation processes of value cycles V_2 and V_3.

Turning now to the second value cycle V_2, consider an instance in which sales have fallen below their target level. Retail's response is relaxing of prices, increased spending on advertisements, and the possible offering of more specials. The overshipments pressure on the manufacturing group in the value cycle V_1 results in specials with larger price elasticities, allocations and ordering in excess of historical amount, and pressure on the person in charge of the specials. This process is portrayed in Fig. 4.

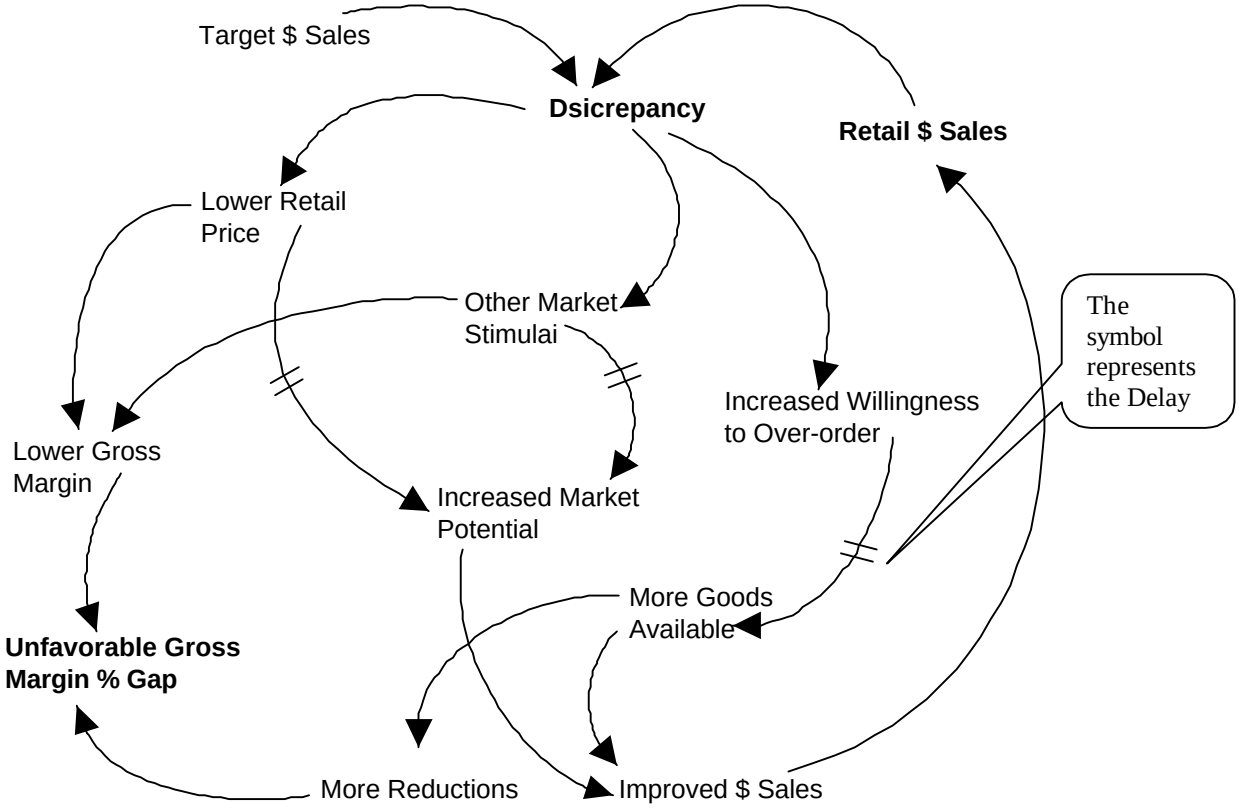

Fig. 4: Correcting the Sales Discrepancy

However, none of these actions has an immediate impact on sales because all require many weeks of lead-time, which we depict as a delay shown in Fig. 4. In fact, the unfavorable discrepancy becomes worse because of the built-in growth in the target sales. This is to be expected, since for many weeks management does not have an opportunity to measure the success of its earlier decisions. Again the value cycles linkage structure identifies the flow of information and decisions across the value chain of the firm.

After some delay, the effects of Retail's efforts are apparent as sales begin to recover. Sales are rising, but lower prices and over-ordering already have had a depressing effect on gross margin. Naturally, Retail's management turns its attention to this second area, improvement of profits, shown as value cycle V_3 in Fig. 3. Now Retail is unwilling to lower prices below their normal level. In addition, pressure is to boost gross margin and cut reductions. Thus, Merchandising responds by being quite conservative in its choice and allocations of specials. Figure 5 exhibit this process.

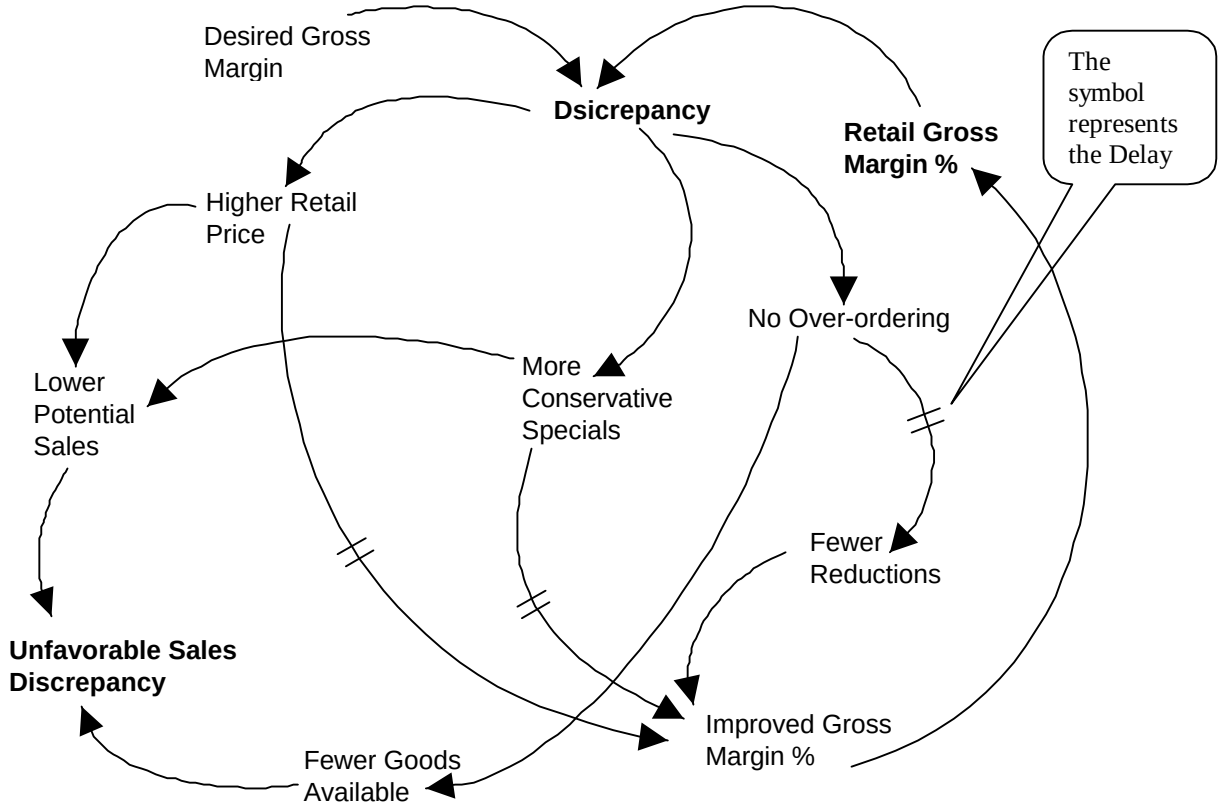

Fig. 5: Correcting the Gross Margin Discrepancy

Again, through the value cycles linkage structure, we are able to see the flow of information and impact of **decisions** being made in a value cycle across the value chain of the firm e.g., impact of gross margin corrective actions (in V_3) on sales (in V_2).

Step 3: Determine the Systemic Leverage across the Value Chain

This step involves the development of a dynamic simulation model of the underlying problem. The causal picture of the value cycles linkage structures, obtained in step 1 and step 2, and the firm's data provide the basis for the model[1] formulation. The model is used to calculate the leverage at the times as the management requires it. **Dynamic leverage** focuses on causal feed back relationships present in a firm's value chain. In our example, value cycles V_1, V_2 and V_3 manifest such feedback relationships. It is the understanding of the dynamic leverage that helps management to know when and where to focus the resource deployment en-route to unfavorable discrepancy recovery decisions. For instance, to improve $ sales management can (i) lower retail price and/ or (ii) initiate other market stimulai and/ or (iii) pursue over-ordering. For long-term sales growth, the pricing and market stimulai initiatives are opted instead of the over-ordering policy. Because, dynamic leverage analysis helps management to know that over-ordering policy provides a low leverage while the pricing and market stimulai entail a high leverage for long-term profitability of the firm.

Structural Leverage looks at integrating and aligning the goals of sub-systems (e.g., Retail's targeted sales, Manufacturing' desired income contribution) with the overarching goal of the system (e.g., firm's profitability). In our case example, the value cycles linkage structures portrayed in Fig. 4 reveals that though the goal of value cycle V_2 (targeted sales) is being met effectively but the goal of the interrelated value cycle V_3 (desired gross margin) is being swayed away. Consequently, this sub-system's inter-goal conflict harms the overall goal of the firm (profitability). This means the misaligned sub goals provide low structural leverage in achieving the systems goals, and call on management attention for possible structural change in the system.

Step 5: Assess the Balance of Performance Measures

The alignment of the performance measures with the firm's goal is assessed in this step. The model simulations provide the basis for this assessment. **Performance measures** play a vital role in the value chain integration. In the cited example the firm currently uses three basic performance measures i.e., retail dollar sales, retail gross margin percentage and manufacturing income distribution. The value cycles linkages structure identifies the inconsistency between performance measure (gross margin percentage) and the firm's goal (profitability). The simulated price reductions of 10-20 % created an enormous potential for bakery goods. However, the opportunity went unrealized because Retail, disturbed by gross margins below traditional levels, was too conservative, as shown in Fig. 4. The use of gross margin percentage that was decoupled from sales volume had an adverse effect on both sales and profit growth. Therefore, to realize to global goal of the firm, the performance measures have to be consistent with the goals of the sub-systems of the firm.

Step 6: Identify, Test, Communicate and Implement the Value Creating Opportunities

How can we lever the current resources to create a higher value both in the short- and long-term? This final step, based on the findings of steps 1 through 5, helps the firm's management make the critical value creating decisions. In the case example the decisions, to opt pricing and market stimulai initiatives instead of the over-ordering policy and use gross margin instead of gross margin percentage as the balanced measure of both sales and profit growth of the firm, are based on their higher leveraging and value creating potential.

[1] The underlying model of the case example is adapted form Roberts (1981). The model script is translated from Dynamo to Powersim.

Thus, the value cycle model provides a coherent way for leveraging system resources to obtain improved performance. The decision-makers are better informed in terms of leverage and value. Leverage tells how much and where to deploy the resources. Value cycles linkage structures incorporate both the lead and lag indicators. The dynamics of variables of the value chain are effectively captured in the value cycles linkage structures. The policy logic (Morecroft, 1985 and 1994) that governs the firms' resource expansion and utilization is also explicitly represented in the value cycles linkage structures. Therefore, the linkage structures via the performance measuring variables tell how much value is created by the decisions. Performance measures, when aligned across the goals and policies of a firms' value chain, send a powerful, consistent message of value creation to the decision-makers and encourage good decision making (Knight, 1997). Hence, value cycles linkage structures by ensuring the aligned integration of performance measures with the goals and policies of the firm aid to better decision making process. Also, value cycles and the linkage structures' view of a firm focuses on using value as the objective for decision making. The focus on value defines the goal, applies the leverages, reduces uncertainty and encourages decision-makers to think through the ramifications of their decisions, which is consistent with the existing knowledge of the field (Porter, 1985; McTaggart, 1994; Kinght, 1997).

5. Conclusion

In value based management perspective, there are studies and models to analyze the value chain of a firm. While they are useful in identifying the main activities and drivers of the value creation process in a firm, they seriously lack in explaining the value activities' internal mechanism and linkage dynamics, which generate value, over time. This study attempts to illustrate the internal mechanism and linkage dynamics of a value chain holistically and builds a dynamic theory towards value based management.

The main focus of this work is the development of a framework that delivers a value based management mechanism engrossing from dynamic resource-based view of the firm, systemic leverage, balanced performance measures and decision-making perspectives. By way of examples, the concepts underlying the proposed 'the value cycle model' have been elaborated.

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