International System Dynamics Conference, Quebec 1998

Operationalising the Resource-Based View of the Firm

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Abstract

Over the last decade academics and practitioners have grown increasingly dissatisfied with traditional strategic management tools as a framework for creating and sustaining competitive advantage. One response has been the development of the Resource-Based View (RBV) of the firm. According to the RBV the firms which perform better are those that hold valuable assets with certain characteristics. Researchers often mention, but have rarely addressed questions related to the operationalisation of the RBV. Operationalisation formalises the theory's ideas and concepts into applicable models, facilitating all stages of strategy formulation and decision making processes. One cause of difficulty in operationalising the RBV is its high level of abstraction. We initially describe prerequisites for operationalisation and demonstrate the need for RBV operationalisation. This is the basis for determining the content and domain of validity of resource-based operative models and an original method for operationalising RBV. The application of this method is illustrated with the example of an incumbent telecommunications network operator's strategy design when facing national market liberalisation. We emphasise the resource selection process based on insights revealed by the resource-based framework. We demonstrate the effectiveness of our operationalization by using our simulation model to explain resource accumulation dynamics and the consequences of different policies. The behaviour of the operationalized theory shows that classic incumbent responses to market liberalisation are ineffective because the incumbent resources management policy design includes mis-perceptions of resource accumulation processes that feed back onto the operator productivity. This in turns decreases the ability to compete against more agile entrants.

Introduction

Understanding sources of sustained competitive advantage is a major concern of both academics and executives. A recent resurgence of interest in the role of the firm as the foundation for corporate strategy (Grant,1991) is a consequence of dissatisfaction with the industrial organisation economics (IOE) framework. The IOE framework emphasises that the core of a firms' strategy is to analyse the firm industry structure to assess the rent earning potential of the industry based on entry and exit barriers. Barney (1991) explains that the weaknesses of the IOE theory spring from two simplifying assumptions concerning their resources: 1) firms within an industry are identical in terms of the strategically relevant resources they control and the strategies they pursue and 2) due to their intrinsic high mobility characteristic, resource heterogeneity leading to sustainable advantage will be short lived.

One response to these problems has been the emergence of the Resource-Based View (RBV) of the firm which is founded on the belief that firms within an industry control heterogeneous strategic resources. Resources are "*all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness*" (Barney, 1991). Stated differently, resources are the strengths that enable firms to implement their strategy. According to Resource-Based View (RBV) certain assets with certain characteristics will lead to sustainable advantage and therefore high strategic returns in terms of market share or profits, I.e. differences (heterogeneity) in firm resources and their degree of immobility determine firm trajectories. Resource heterogeneity can be long lasting and therefore produce sustainable advantage since these resources may be not perfectly mobile across firms. Strategic analysis should make clear why firms are able to get into advantageous positions and how they are able to sustain these positions (Black and Boal 1994). However, a Resource-based view strategy cannot provide competitive advantage without being operationalised. Operationalisation means a formalisation of the theory's ideas and concepts into applicable models which facilitate all stages of strategy formulation and decision making. The RBV theory needs to be operationalised because of its inherent high level of abstraction. This

makes it difficult for practitioners to recognise which resource-based strategy will lead to sustainable advantage. Consequently, operationalisation is a unique opportunity for managers to benefit from the powerful strategy support that this theory can bring (Peteraf,1993).

The operationalisation of RBV theory is fundamental because it directs managers in their resource-based strategy implementation. This is particularly important since human decision making processes can be biased and misleading (Simon, 1957,1976,1979; Cyert and March, 1963). Strategic asset choices are complex and made under uncertainty due to shifts in consumer preferences, economic and political trends, or from competitive actions and may entail opposing biases with network effects which are difficult to measure (Amit and Schoemaker, 1993). To keep strategic asset decisions within cognitive bounds managers often extensively simplify, leading to additional biases. Finally, Amit and Schoemaker emphasise that inter-organisational conflicts arising from cross-functional structures creates a need for a multidimensional framework which includes internal and external elements, static and dynamic aspects, and rational as well as behavioural considerations. This kind of model should assist managers identify ex ante a set of strategic assets[1] as grounds for establishing the firm's sustainable advantage.

Attempts to Operationalise RBV Theory

An evaluation of operative RBV models requires criteria to value model potential. According to Black and Boal (1994) operative resource-based models should provide guidelines for resource identification and selection and address the dynamic aspect of bundling resources. In addition, Amit and Schoemaker (1993) point out that managers need to make resource deployment decisions *ex ante*. Hence, they have to face biases and errors arising from uncertainty, complexity, and organisational conflicts. Resource-based models support strategy design by providing operative tools that make it possible to trace consequences of different strategies. Therefore operational resource-based models should "reveal flaws and inconsistencies in proposals that might not otherwise come to light until the proposals are implemented and under way" (Morecroft,1984). To do this operative resource-based models must embody four characteristics:

- Provide guidelines to identify and select valuable resources
- Portray the resources' intrinsic endowment dynamics
- Depict how managerial policies affect resource management
- Have the ability to trace consequences of potential strategies over time

We evaluate the operationalisation of seven RBV models (Amit and Schoemaker,1993; Barney,1986; Barney,1991; Black and Boal,1994; Dierickx and Cool,1989; Grant,1991; Hall,1992) using the criteria above. These models were selected due to their contributions to operationalising RBV theory.

All seven models *provide guidelines to identify and select valuable resources*. RBV authors have precisely determined which attributes make a resource valuable and which traits underpin those attributes. An example of resource attributes building up valuable resources is the difficult imitation (attribute) of a firm's innovations (resource). As a natural extension of this process researchers have specified the traits underpinning valuable resource attributes. For example difficult imitation may spring from causal ambiguity, i.e. difficulty in identifying which factors combine together to manufacture innovative products. In this example RBV operationalisation occurs partially by providing guidelines to identify and select those valuable resources. Barney (1986) suggests that only informational advantages make it possible to discover and amass valuable resources before competitors. Environmental and organisational analysis of a firm can support the decision making process of selecting

[1] Strategic assets are defined in this case as the set of resources and capabilities that gives the firm competitive advantage and are difficult to trade and imitate, scarce, appropriable and specialised.

valuable resources by providing this kind of advantage. Other authors (Grant, 1991; Barney, 1991; Hall, 1992; Peteraf, 1993) propose conceptual models which direct managers when formulating resource-based strategies through an appraisal of resources and capabilities to help select a strategy which best exploits the firm's resources.

Two contributions have partially *portrayed intrinsic resource endowment dynamics (Dierickx and Cool,1989; Black and Boal,1994).* Dierickx and Cool (1989) establish a theoretical framework aimed at describing resource bundling dynamics. Although they see management's role as designers of policies based on the resource stock dynamics operationalisation guidelines are not addressed. Thus, efforts should be made to allocate appropriate expenditures to maintain adequate resources given the internal resource-system interaction dynamics and erosion of resources. Stock level regulation is achieved given those conditions and goals set by management.

Black and Boal (1994) make an important step toward the operationalisation of resource dynamics management by applying methodologies derived from social network theory. This technique is based on the drawing of a system resource network configuration decision tree. By using six strategic questions practitioners should be able to identify valuable resources and then understand the implications of changing one factor of one resource on other apparently unrelated resources. This approach makes an important contribution to operationalising RBV theory by providing a clear and applicable framework to select valuable resources and use the causal relationships within a resource system. However, this work is limited in two important ways. First, a clear picture of the resource system is not established. This makes the discovery and tracing of all network relationships is difficult. Therefore hidden feedback relationships can lead to errors. Second, it does not provide and allow a quantification of the scale and rate of changes of resources. This prevents the quantification of relative strategic returns as the basis for comparing alternative strategies.

None of the reviewed models *depict how managerial policies affect resource management or make it possiblefor strategiests to trace consequences of potential strategies over time.* This prevents their use for testing alternative strategies.

None of the models evaluated embody all four characteristics required for the effective operationalisation of a RBV mentioned above. Only the first condition is addressed satisfactorily. In the light of the our assessment framework of operative models this indicates a limited potential by these models for successful operationalisation.

A Methodology for Operationalising RBV of the Firm

We operationalise RBV theory in five steps embodying three levels of analysis: the firm's environment, the firm, and resources. Those three levels encapsulate and structure the four necessary conditions for operationalisation indicated in the previous section. At the environmental level external factors (foreseeable or uncertain) having the power to significantly affect resource-based strategy design are identified and listed. Analysis at the firm level portrays consequences of resource policies on the firm. Because human decision making processes are subject to bounded rationality such resource-based models must have the capacity to show inconsistencies in resource management. For example, conflicting or eroding goals may defeat an otherwise effective strategy. Strategy analysis at the resources level describes resource endowment dynamics. At this level the speed and rate of change of resources is quantified to assess and compare alternative strategies by highlighting how resource traits affect resource attributes and determine the overall value of a resource-based strategy. Enhancing or compensatory relationships between accumulated resources and their natural erosion are important resource traits in resource level analyses.

Based on the four requirements for effective RBV operationalisation and the three levels of analysis we use a five step methodology to operationalise RBV theory:

Step 1: List valuable resources: Based on data collected through an environmental and internal resources appraisal we explicitly list the resources which contribute the most to strategy formulation.

Step 2: Sketch resource charts: We draw resource behaviours over time to describe the development of resources and to pinpoint interactions within the resource system. The degree to which each resource can be managed is estimated.

Step 3: Draw key-resource maps: Resource charts are used to describe each system's relationships, thereby making it possible to describe the overall resource system. Feedback structures are identified.

Step 4: Identify resource strategic plans and managerial policies: We explicitly formulate the management mental models and policies as the basis for understanding how human decision-making processes affect resources endowment.

Step 5: *Develop system model* which can explicitly formulate relationships between resources, trace the scale of change and test alternative managerial policies and strategies as a basis for improvement.

These five steps specify strategy descriptions and analysis actions that span and interact on the three levels of analysis to fulfil the four operationalisation requirements. For example step 3 acts at the resource and firm levels to describe resource endowment conceptually and help identify which resources are most valuable. In the next section we test our methodology by demonstrating its use to operationalize a firm's strategic resources and for strategy analysis.

An Example Operationalisation of a Resource-Based View

The remaining part of this paper demonstrates how RBV can effectively be operationalised with an example from the telecommunications industry. Telenor Network Operator (TNO) is the incumbent monopoly provider of fixed network telephony services in Norway. However, the liberalisation of the Norwegian telecommunications industry in 1998 allowed full competition, so the firm faced the strategic problem of crafting a strategy to defend the monopoly market share. TNO's strategic goal was to minimise market share losses after the introduction of competitors.

Step 1: List Valuable Resources

We gathered data to identify key resources by conducting an internal and external survey of the TNO business environment (Mahieu, 1997). This survey was based on organisational stories and in-depth interviews with several Telenor network and service provider managers over four months. Before deregulation TNO has 100% of the market for residential, business, and leased lines service providers. Its infrastructure is fully developed while competitors must either rent or build one. Like most monopoly telecommunications markets TNO line rental charges do not cover the cost of access (Lyneis, 1995). TNO possesses a large amount of goodwill in the telecommunications industry. Telenor group (TNO's parent company before deregulation) is highly profitable and has access to significant investment possibilities. An internal appraisal pinpointed that TNO's ability to face market deregulation successfully depends on maintaining a strong market position. Such aptitude is based on two crucial capabilities: 1) maintaining **competitive prices** through the flexibility produced by sustained sales and 2) preserving a **high level of inertia[2] and awareness of TNO's products in the most profitable (i.e., business service providers) customers' segment**. This should prevent

[2] We define service provider inertia as a measure of the service providers' tendency to remain Telenor customers although competitors utility function is perceived as better.

rapid decrease of TNO volume of long distance and international traffic, and thereby TNO's profitability.

Based on the foregoing we identified TNO key resources. Those assets play a major role TNO's ability to compete against entrants and are directly under the threat of being depleted due to competition. As an example the capacity for building infrastructure is not considered as key resource because it is not threatened with depletion due to competition but customer base is considered a key resource because it is both considered critical for effective competition and threatened. Key resources are listed in Table 1 below.

Tangible Resources

Business service provider customer base
Cash

Intangible Resources

Service provider inertia, i.e., amount of customer allegiance devoted to TNO.
Service provider awareness to competition, i.e., this variable depicts how TNO customers are informed about TNO activities.

Table 1: Key Strategic Telenor Resources

Step 2: Sketch Resource Charts

Specific interactions found between the four most valuable resources of TNO's resource system are shown in Table 2 with performance indicators which can be used to assess resource development over time. Further specifications of key-resource interactions are depicted in step 3.

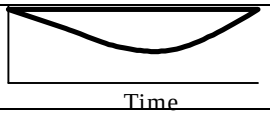
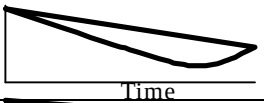
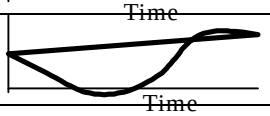
Resource Name	Unit	Behaviour over Time
Customer Base	Subscribers	
Cash	NOK Norwegian Krones	
ServiceProvider Inertia	% capacity repurchase	
ServiceProvider Awareness	Index from 0 to 1	

Table 2: TNO Resource Charts

The curves presented in table 2 are based on the analysis of historical data from several network operator market liberalisation cases (European American Centre for Policy Analysis, 1994) and international market analysis produced in Telenor. These curves suggest causal relationships among the resources and other important strategic variables. For example the initial reduction in customer base, cash, service provider inertia and awareness can be caused by a low level of promotion outlays. As promotions grow in response to pressure from management service provider inertia and awareness rise and customer base depletion is stopped. After a delay the sustained growth of service provider inertia and awareness provoke an expansion of the customer base followed shortly thereafter by cash level. We describe these relations more specifically in step 3 and simulate their behaviours in step 5.

Step 3: Draw Key Resources Map

In this step we specify the relations which link valuable resources and other strategic variables. We illustrate this process with a causal loop diagram[3] (Goodman, 1974; Richardson and Pugh, 1981) which describes the interaction of two of the resources identified in steps 1 and 2 (Customer base and Cash, and a performance measure (Market Share).

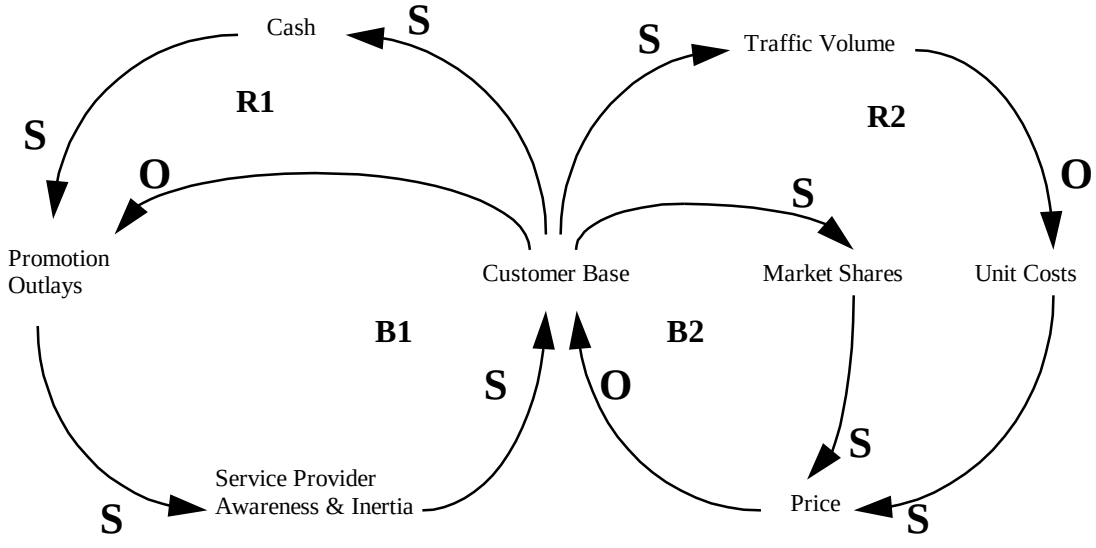


Figure 1: A Partial TNO Key Resources Map

Figure 1 depicts a simplified portrayal of the major loops assumed to drive the ability of TNO to compete in a deregulated market. Two reinforcing and two balancing loops constitute the fundamental structure of the TNO's subsystems. In reinforcing feedback loop R1 a reduced customer base decreases income and therefore the cash level (costs being kept constant). As profitability diminishes less money is available for promotions. Service provider awareness and inertia decrease, causing further customer base losses. Balancing feedback loop B1 counteracts this reinforcing effect as follows. As Telenor's customer base decreases managers are assumed to increase the promotion of firm products to increase service provider awareness and interia. This will slow the erosion of the customer base and potentially cause it to rise.

The second group of feedback structures describes Telenor's network pricing flexibility. Reinforcing feedback loop R2 depicts a cycle of increasing or decreasing prices. According to regulations prices are costs-based. Therfore customer losses increase unit costs (assuming total costs remain constant) which results in increased prices. Consequently, as price augments market attractiveness diminishes depleting further the customer base. Balancing feedback loop B2 describes the loss of market share as the customer base shrinks and the

[3] Causal loop diagrams describe the interconnected feedback loops which are among the basic structural elements in systems that generate dynamic behaviour (Richardson, 1991). As used here and according to Forrester (1968, p. 1-7) *"The feedback loop is a closed path connecting in a sequence a decision that controls action, the level of the system, and information about the level of the system, the latter returning to the decision-making point."* An "S" in a causal loop diagram indicates that the two factors move in the same direction: that is as one variable increases, the other variable also increases. An "O" indicates that variables move in opposite direction, as one factor increases the other factor decreases. Two basic types of feedback loops, reinforcing (identified as R1, R2) and balancing (identified as B1, B2) are used to explain the dynamics of complex situations. Reinforcing loops promote movement, either growth or decay, by compounding the change in one direction. Balancing loops resist change in one direction and tend to bring systems back toward a specified goal or equilibrium state. These two simple structures can be combined into causal loop diagrams in a large variety of ways to describe complex systems.

resulting downward pressure on Telenor prices to remain competitive with the resulting improvement in the customer base.

Diagrams similar to the one shown in Figure 1 were used to map all other key resource relationships (Mahieu, 1997).

Step 4: Identify Resources Managerial Policies and Strategic Plans
In this step we describe TNO's strategy and policies for competing in an open market to the extent necessary to model their impacts on market share. This perspective of the business is independent from the material that has been presented in step 1 to 3. In order to avoid losing a large portion of its most profitable market share TNO conducted several surveys of both its internal and external environments. The strategy based on these surveys has three focuses: organisational efficiency, regulation and service providers.

Strategy for Increased Organisational Efficiency: Improve the firm's ability to compete in a liberalised market by developing three capabilities: reduce operating costs, increase staff productivity and price services for increased network utilisation. Policies designed to reduce operating costs included:

- Extend the life of the existing network through measures such as enhanced maintenance programs or replacement of obsolete components.
- Shift investment toward only useful technology and away from optional or "nice to have" technology which played an important role in the past.
- Improve operating practices with measures such as pro-active maintenance, improved co-ordination and planning
- Minimise research costs
- Reduce operating staff

To increase staff productivity TNO applied special training programmes. Pricing for increased network utilisation to reduce unit costs required the development of consensus at both the business and corporate level about several incentives proposed to TNO's service providers. Pricing policies included:

- A new discount policy based on the volume of traffic purchased is established.
- Contracts with annual subscriber fees and obligation to order a minimum quantity of traffic volume to take advantage from the discount policy proposed.
- Apply penalties if the purchased quantities are lower than the ordered.

Regulator Lobbying Strategy: An important part of TNO strategy is to influence the entire market by lobbying market regulators in the Norwegian government. TNO desires to share Universal Service Obligations (USO) with competitors. In addition, TNO wants the authorities to regulate the access network to prevent other access networks from being constructed and have access capacity deficits absorbed by the existing market players according to their market share level. Pricing flexibility could again become a reality in this case. However, regulations which comply with EC directives include plans to finance this access capacity deficits through interconnect fees.

Strategy to Reinforce Relationships with Service Providers: To end decades of rivalry within the Telenor group, TNO intends to develop good partner relationships with its service providers. This is based on the understanding of their needs and the pricing policy described above. For example TNO aspires to collaborate with service providers to establish

programmes to better understand the needs of business end-users. This kind of co-operation is seen as a unique opportunity to develop good contacts with service providers and increase service providers customer loyalty.

Step 5: Develop System Model

Based on the preceding a dynamic causal simulation model depicting a typical market liberalisation for the operator incumbent was developed. We selected the system dynamics methodology primarily for two reasons. First, once valuable resources have been identified and selected, causal loop diagrams (Goodman, 1974; Richardson and Pugh, 1981) may be used to map the overall system interactions and feedback structures as we illustrated in step 3. Polarities of these loops can also be determined providing insights into resource accumulation dynamics. Gary (1997) illustrates how these diagrams can be useful when building conceptual models for explaining dynamic resource interactions as the basis for studying diversification strategies. Second, concrete features of system dynamics models fulfil the resource-based model's simulation requirements described previously with stock and flow representation (Dierickx and Cool, 1989; Morecroft, 1997), mathematical formulation (Glucksman, Mollona, and Morecroft, 1997) and feedback loop structures (Morecroft,1997; Back and Boal, 1994) which provide the ability to model human decision making processes and organisational routines (Amit and Schoemaker, 1993; Morecroft, 1983,1984,1985).

Model Overview: The model consists of eight subsystems (1 to 8).

Telenor Capacity Subsystem (1) is desegregated into six sectors (a to f). Single stocks describe the access (a), trunk line networks (b), and the associated switching platforms (c). Telenor Network possesses already the required infrastructure to fulfil service providers demand for capacity. Switching staff accomplishes operations linked with calls' logistics (d). An assessment of both the physical infrastructure (e) and service quality (f) level is done. The model includes the delay for service providers to perceive changes in TNO quality. This delay is very important since it drives customers purchase behaviour. Estimations set the value of this delay to six months.

Telenor Resources Subsystem (2) contains the critical intangible resources assumed to give to Telenor the possibility to maintain a strong market position. The concept of service provider inertia is operationalised. This variable is modelled as a stock having for unit the percentage of service providers capacity repurchase. Service provider awareness to competition is also modelled as a stock. The higher the level of that resource the higher TNO's customers are sensitive to TNO's products.

Telenor and Competitor Financial Subsystem (3) & (6). Incomes are calculated based on the size of TNO's customer base. Revenues are functions of the end-users number, call time, number of calls, and geographical calls distribution. The price sector is the last part of TNO's financial subsystem. Price can be set according to three different ways. They can be cost based, set manually, or based on competitor's price.

Competitor Capacity Subsystem (4) is more detailed than the one of TNO. The reason of doing so is because the model must reproduce network expansion dynamic patterns. Three main delays drive competitor network expansion. First, it takes time to do the engineering work of digging cables or making switching platforms operational. Second, because competitors start from scratch they have to hire people to operate the networks they build. Third, there is a delay (same than TNO) for service providers to perceive changes in entrants network reliability and service quality. This delay is critical for entrants. If a shortage of capacity occurs while customer base grows it will take time before service providers will react and decide to shift back to TNO. Consequently, customer base continues to enlarge causing network reliability to decrease further.

Competitor Resource Subsystem (5) is more simplified than the one of TNO. Two reasons explain this choice. First, it is not the initial focus of entrants strategy. They have to build a reliable network and establish durable service quality as a primary task. Second, as competition has not started yet, there is a lack of data concerning competitors promotions

outlays programme. Consequently, service provider inertia policy management is not modelled.
Market Subsystem (7) structure is typical from models aimed at capturing the dynamics of established customer rivalry. That means that new competitors do only try to capture incumbents established customers. The model does not focus on market expansion dynamics. For traditional telephony products it is clear that a yearly growth of 1 or 2% is a maximum value. Consequently, the model does not include a stock-labelled "potential customers". TNO and competitors customer bases are connected by two flows. The switching rate, between the two customer bases, is determined by combining the effects of relative quality and price performances of each network operator.
Regulator Subsystem (8). First, the model calculates the amount of traffic that is subject to interconnect for both operators. This traffic calculation is based on the size of the customer base. Once the amount of volume has been determined it is then possible to calculate both the income that arises from the fees, and the costs associated with traffic interconnections operations.

Modelling Service provider Inertia: The components of TNO's competitive conditions and strategy described conceptually above were formalised into a simulation model. As an example of this process for a critical portion of a RBV analysis of TNO's strategy we describe our formal modelling of service provider inertia. We measure service provider inertia with the percentage of service providers who repurchase capacity from TNO. Since service provider inertia grows and declines gradually over time we model it with a stock (indicated by a box in figure 2).

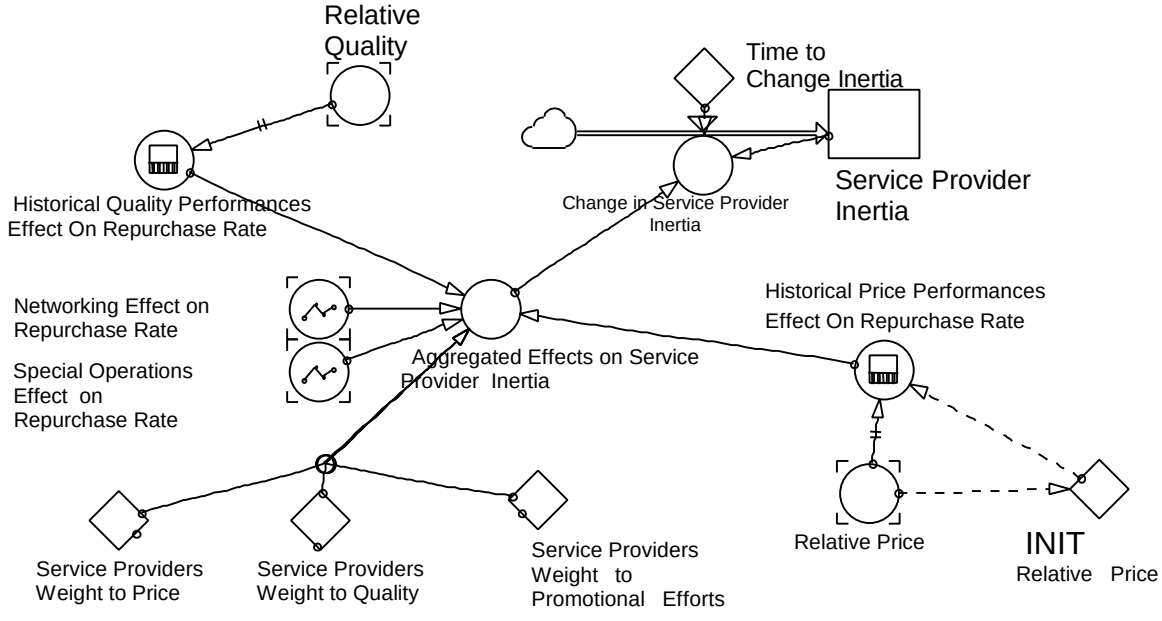


Figure 2 TNO Business Service Providers Inertia Model Structure

Figure 2 shows how the stock Telenor Business Service Providers Inertia

$$\textbf{Service Provider Inertia}_{t} = \int_{t_0}^{t} \textbf{(Change in Service Provider Inertia)}\, dt + \textbf{Service Provider Inertia}_{t_0}$$

{Unit = Percentage Service Provider Repurchase}

Change in Service Provider Inertia = (Aggregated Effects on Service Provider Inertia - Service Provider Inertia) / Time to Change Inertia
{Unit = Percentage Service Provider Repurchase / Week}

The value of this rate is equal to a fraction of the difference between **Service Provider Inertia** and the **Aggregated Effects on Service Provider Inertia**. The variable **Time to change Inertia** setting the fraction represents the time required for actual inertia to adjust inertia level indicated by the aggregated and weighted effects of four components: perceived quality, price gaps and promotions directed at service providers or networks.

XX factors are aggregated to cause changes in Service Provider Interia: historical quality and price performance and promotions for special operations or networks. Historical Quality Performances Effect On Repurchase Rate: we assume that service providers assess the previous four months quality variations to determine their likelihood of changing service. This relationship says that a persistent gap in the relative quality affects the willingness of a service provider to stick with a network. Service provider inertia will increase if long term relative quality is favourable to Telenor and vice versa. We estimate that a small gap in relative quality makes a significant difference for service providers. A positive relative gap of 10% causes service provider inertia to boost over 84% repurchase rate. Conversely, a negative gap of 10% makes service provider inertia to decline towards 65% repurchase rate. Price gaps between TNO and Competitors (Historical Price Performances Effect on Repurchase Rate) are also observed during an equivalent period and impact the indicated inertia. A converter specifies that the more expensive TNO is relative to its competitors the lower service provider inertia decreases. A 20% higher relative price generates a 60% service providers repurchase rate. Conversely, if TNO is 15% cheaper in the long run that market entrants, service provider inertia approaches 80%. Finally, TNO promotions support and build customer loyalty. Funds can be allocated either to support service providers special operations (Special Operations Effect on Repurchase Rate) or to networking activities (Networking Effect on Repurchase Rate).

Our complete model describes the many other interactions required to simulate and test TNO strategies. Mahieu (1997) provides complete model description, documentation and testing.

Application of Operationalised Theory

We use model simulations to test and challenge strategies in view of the RBV theory. These tests are the basis for the design of improved policies.

Tracing the Scale of Change and Testing Managerial Policies

The operationalised theory can be used to trace the evolution of TNO's resource system over time. Management strategies can be assessed in the light of relevant performance indicators. A possible development of competition based on the policies in step 4 are shown in Figure 3 which we call a base case strategy. In this simulation Telenor Network Operator (TNO) faces market entrants targeting only business customers. These players are able to build a reliable infrastructure within a period of 2 years. Entrants prices for capacity are 35% below than those of TNO. No special marketing effort is deployed by TNO. In the same vein, TNO's relationships with service providers' are not developed satisfactorily. Figure 3 depicts the incumbent's inability to design an efficient strategy to protect its most profitable customer base.

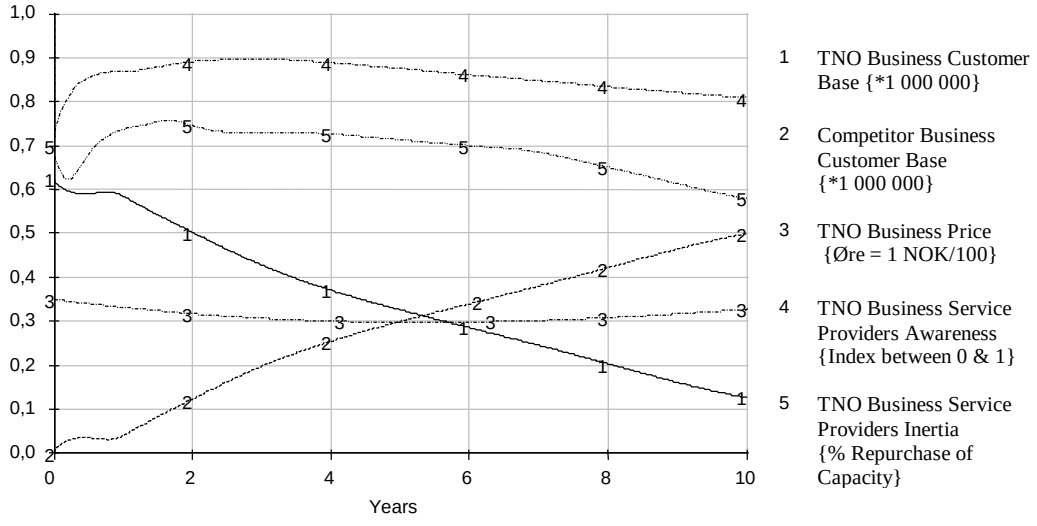


Figure 3: Simulated TNO Performance under Base Case Strategy.

Simulation results exhibited in Figure 3 indicate that TNO strategy suffers from inconsistencies. TNO's most profitable customer base declines to a point that endanger the survival of the business. Only one explanation can explain the failure of this strategy. Key-resources are not managed. Two feedback loops (R1 and R2 in Figure 1) explain that TNO business customer base tails off over time. Service provider inertia and awareness are low because TNO promotion outlays policy does not fully support service providers expectations. As cash level shrinks because of customer base depletion, the percentage allocated to promotional spending wilts. Similarly, costs savings over time are not sufficient to substitute losses from sales revenues. As profitability erodes unit cost increases followed after a delay by TNO's price for capacity. Attractiveness drops away causing customer bases to dwindle.

Additional model simulations and analysis reveal that three interrelated effects can explain how these two reinforcing loops can interact in a destructive way for TNO. TNO has difficulty in discerning the apparent condition of its key-resources. Service providers awareness and inertia are two "soft" concepts which make them more difficult to observe and include in strategies. As a consequence of this difficulty to discern and quantify service providers inertia and awareness, TNO has difficulty to set a goal for these resources and design a strategic plan to achieve this goal. Conversely, network reliability and service quality (more easily quantifiable variables) are a constant concern for TNO. Hence, an ambitious program aimed at improving an already highly reliable infrastructure is selected.

Second, a damaging dominant logic[4] (Prahalad&Bettis,1986, Morecroft,1997) prevails in Telenor. Based on long rivalry between TNO and the other business units, TNO considers itself as the core business of the Telenor group and the most important added value contribution to the Telenor group. Hence, engineering activities are be seen as fundamental while sales activities or customer services are only secondary. This dominant logic lowers the ability of TNO to consider service providers as their most important asset. Consequently, they fail to design an appropriate policy aimed at supporting and answering the needs of service providers. The low level of promotional spending compared to costly network improvements springs from this logic and drives resource management.

Finally, TNO has problems identifying the apparent condition of its intangible resources and because of the dominant logic prevailing within this business unit TNO is not able to discover

[4] According to Pralahad and Bettis, the dominant logic of a firm is a mind set, a world view or conceptualisation of the business and the administrative tools to accomplish goals and make decisions in that business.

and interpret hidden or invisible information feedback aimed at providing signals to re-consider and re-orient the firm's strategy when necessary.

Policy Analysis for Improving the TNO Defence Strategy

The aim of this section is to design a policy able to prevent TNO business customer base depletion in a context of market liberalisation. In order to implement the mechanisms aimed at providing powerful information feedback intended to modify TNO's strategy if necessary. In an alternative scenario TNO faces a market entrant targeting only business customers. This player is able to build a reliable infrastructure within a period of 2 years. Entrant price for capacity is 35% below than TNO's. Nevertheless, TNO deploys special marketing efforts and service providers' relationships are developed and maintained. To describe this strategy we modify the model's structure. So that promotion outlays (PO) are not based on a fixed percentage of sales revenues. It is a complex mechanism encapsulating four different effects that determines the amount of sales revenues allocated to promotional spending. The value of this stock is the result of a managerial policy based on three elements. They are the network operator cash available, its debt level, and its market position. *PO Change from Market Position*. This relationship indicates that market share losses cause to increase promotion effort. Change in TNO level of desired promotional spending depends on the relative number of customers that its competitors have. If TNO perceives that its market position erodes, it cranks up its desired level of spending on promotional activities (and vice versa). *PO Change from Debt Ratio*. As an operator debt level increases it is likely that its promotion effort would be reduced. The debt ratio is evaluated by comparing the debt level to a network operator book value. *PO Change from Cash Ratio.* This relationship represents the impact that an operator's liquidity position has on its desired level of promo spending. If Telenor Network is short of funds, it dials back its desired level of promo spending (and vice versa).

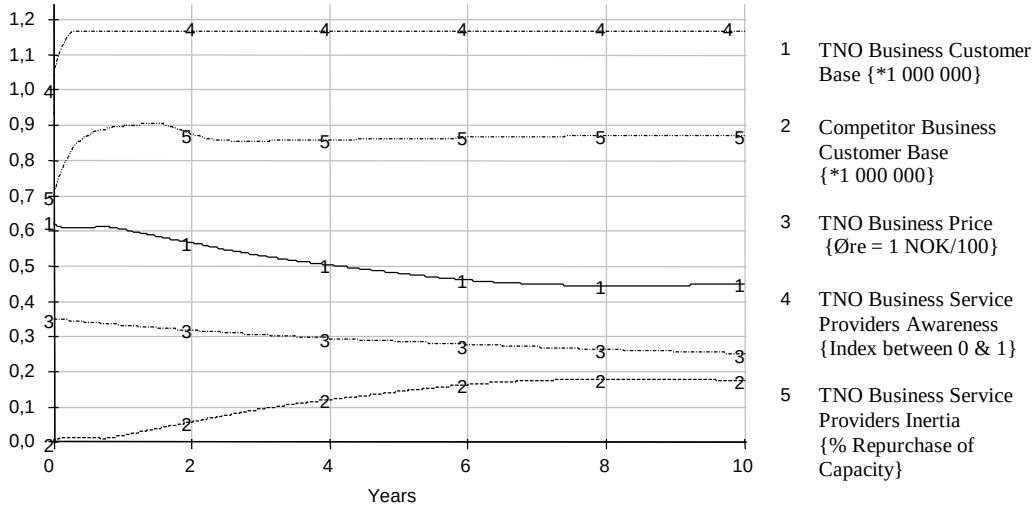


Figure 4_An improved Strategy Design from Telenor Network Operator

Using this strategy TNO service provider's awareness and inertia perform better. In addition, because of a sustained profitability level, TNO can decrease its prices for capacity in a constant manner. Consequently, its attractiveness is further swollen. Our analysis of the structure of the operationalised theory helps explain how a successful strategy for keeping TNO profitable can maintain market share for at least ten years following market liberalisation through four elements:

- Relationships with service providers are a high leverage portion of the system and therefore should become the main focus of TNO. This statement implies that a shift in the dominant logic of this business unit must occur.

- The use of soft variables and explicit resource endowment structure descriptions is critical to successfully setting and adjusting strategies and policies by management. TNO must operationalise the management of its key-resources system to build an organisation that has the capacity to perceive and understand service providers needs and problems.

- Although price reduction can be effectuated progressively during the first three years of competition or suddenly after three years TNO prices should be competitive when entrants have established adequate network infrastructures. At this time network reliability will no longer be critical for entrants even their customer base grows at a rapid pace.

- Fixed costs savings is another high leverage portions of TNO's strategy. However, cutting costs may have serious unintended effects on deliveries quality.

Conclusions

We have described an effective means of operationalising the Resource-Based View of the firm which uses five steps and three levels of analysis to guide the development of a system model which can be used to design and analyse strategy alternatives. Our process includes the explicit identification and selection of valuable resources, overall description of the resource system, mapping relationships between key-resources and development of a simulation model which explicitly and precisely describes those relationships. We demonstrated the applicability of our process by describing how we used it to operationalise the strategy of Telenor Network, a telecommunications operator facing new competitors for the first time. We illustrated the effectiveness of our operationalised theory by illustrating its use for simulating Telenor management's intended strategies to trace the scale of changes of key-resources over time. If undesirable consequences are discovered, a policy improvement process based on strategy re-formulation takes place.

We have found that the system dynamics methodology can support major components of this operationalisation process. More specifically, causal loop diagrams and stock and flow diagrams help fulfil the conditions required for successful operationalisation. Thus, resource policy analysis and design fits naturally with the ability of system dynamics models to trace resource trajectories over time. In addition, these models can be used to quantify the speed and rate of change of resources because they are quantitative and provide explicit mathematical descriptions of the resource system. In addition, system dynamics models allow the assessment of which resources are likely to be critical or deficient when crafting a strategy. Therefore they can be useful in helping managers understand how their firm can build and sustain a competitive advantage. Moreover, system dynamics can explicitly portray both reinforcing and balancing feedback loops which allows policies governing corrective action or goal adjustment encapsulating the dominant logic of resource management to be incorporated in strategies. Finally, structures of SD models assume implicitly bounded rationality in decision making. That makes possible to model human decision making processes and organisational routines. Relationships between a firm's "dominant logic" and a firm's resource accumulation strategy can be again described by SD models integrating a different perspective.

A challenge in operationalising the RBV is quantifying intangible resources. The concept of service provider inertia illustrates this observation. This concept arising from the marketing

literature has been developed to describe customers purchase behaviours related to the consumption of traditional goods. Thorough analysis is required to understand what drives service providers managers behaviour when repurchasing capacity to a network providers.

Based on our work we conclude that RBV's theoretical concepts and ideas can be effectively operationalised. This helps fill an important gap in the strategic management field concerning explaining how RBV theory can be developed and implemented rather than what RBV theory should consist of. System dynamics plays a major role in operationalising this process.

Based on our application to Telenor Network we also conclude that the complex relationships between network providers and service providers suffers from inadequate attention although they are fundamental in the new age of telecommunications. This can be used to improve strategy formulation of vertically integrated telecommunications firms.

Further work can focus on the further operationalisation of soft variables and the concept of organisational competencies or a thorough explanation of the relationship between dominant logic and resource endowment dynamics. The resulting improved operational resource-based view modes of firms can provide the means for strategists and managers to improve firm performances.

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