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# How Flexible is the Strategic Innovative Performance Target Design without Sacrificing Lead Time

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**Abstract**

*Designing flexible performance targets means completely specifying specifications and freezing them completely all the features within a stipulated time frame which is a marathon task. At the same time the product should also delight the customer is another challenging task. Herein, the two pre-requisites, firstly reducing the drivers of long lead time and secondly using inherently fast techniques will improve innovation lead time which will further compress innovation lead time and create winning differentiation. "*Law of Lead Time"* *of any process governs a project (it is also known as Little's Law).*

*Experiential designing of the product and 'evolvability' are some dominant parameters for flexible design of performance targets. For flexible performance target the fast innovation techniques are most desirable. There are three imperatives: Differentiation, Fast – time to – market and the most important 'Disruptive innovation'. In short disruptive innovation redefines the market place - creating entirely new curves in such a way that a new set of factors determine profitability and success, which makes the previous competitive advantage obsolete. This decidedly create revenue growth and value creation /value addition to the designed product.*

*In the present paper a fast innovation rather innovation blitzkrieg model has been evolved and a successful Toyota case study and case study of Nokia has also been discussed as world leader in product development and as a forceful strategic innovator.*

***Keywords:*** *Flexibility, Innovation, Innovative performance targets*

## Introduction

Connecting strategy to execution building organisational capabilities that allows companies to achieve and further sustain the continuous change and innovation has been the prime concern of the top management. Ceaselessly enhancing flexibility and efficiency in all customer-centric and back-end processes decidedly requires co-creating value and unique experiences at a continual pace. Thus, CEO, executives and managers at every levels requires striving transformation of the business breakthrough technologies, supply chain management (SCM) strategically for creating an ongoing innovative advantages.

Designing a flexible performance targets is the crux of 'fast innovation 'system - may have more than one performance level. The knowledge arises from experience and investigation-which can very rarely be predicted before the start of the project. (George *et al*. 2005, Prahlad

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*et al*. 2004). Govindrajan *et.al*. (2010), observes that the real challenges of innovation lies beyond the idea. It lies in long hard journey- from imagination to real impact. 'Performance engines' may not be able to tackle every innovation initiative; nevertheless they are incredible powerful tools. Though it is a heavy- duty solution, but is dire essential and is absolutely necessary. Govinrajan has successfully suggested an innovation model which is certainly beyond IDEA:

Innovation = idea + leader + team + plan …….. (1)

It is very much evident that innovation must include organizing and planning capabilities beyond only idea. 'Making it happen' from the idea to the product is the whole crux of the journey.

Strategic innovation proceeds with 'strategic experiments'- high growth potential of new businesses, that test the viability of unproven business models. Strategic experiments have characteristics and are generally 'non- linear'. As today's market place is characterized by rapid and non-linear changes, we can firmly retort that strategic innovation is a process of exploring experimental strategies. And more importantly 'performance engine' is made of two parts. One dedicated team, two shared staff. To make a right choice, we have to accurately access the capabilities of the 'performance engine'. i.e the project team.

Before, we embark upon further details some basic clarity of the definitions is tried out here.

- **Innovation:** "Innovation involves the creation of a product, service, or process that is new to an organisation." (Khalil, 2000)

  Or

  "Innovation redefine the marketplace in such a way that a new set of factors determine profitability and success." (George *et al*. 2005).

At the same time "invention" is:

- **Invention:** *"Invention*" is either a concept or the creation of novel technology".

  Inventions and innovations are intimately related; however they are not the same. An invention can be thought of as an *event,* whereas, innovation can be clubbed as a 'process', which is in professional management parlance can be called as *'activity'.*

- **Strategic Innovation**: *'Strategic Innovation'* involves testing new, unproven and significantly answers to at least one of the three fundamental questions of strategy: one. Who is your customer? Two, what is the value you offer to the customer? Three, How do you deliver that value? (Govindrajan, 2007, 2010).

Further ***'disruptive innovation'*** is also about, offerings, process, methods, technologies etc. that represent a major shift from the earlier products, services or processes. We will deal in detail subsequently.

All the above ingredients require 'core competencies', which needs development of new skill, technology and lastly but not the least attitudinal change. 'Lead time principles' and what is lead time and closing lead time gap shortens the logistics lead time which simultaneously move the customer's order cycle closer by giving earlier warning of requirements having improved visibility of demand.

In the present paper, further we have discussed 'designing of flexible performance targets' and some suggested 'Innovation Blitzkrieg Model'. Also, case studies of Toyota and Nokia have been briefly presented in the paper along with the philosophy of ' Toyota Ways' working in flexible designing system.

**DISRUPTIVE INNOVATION:** Offerings, process, methods, technologies etc. that represent major shift from everything that has come before. "Disruptive innovation eliminate or marginalize the revenue growth and value-creation potential of an incumbents offerings" (George *et al*., 2005).

Christensen (1997) and Raynor (2007) have also discussed disruptive ( a disruption in technical sense) innovation arise out of two industry colliding with each other regarding technology improvements due to also of a kind of big explosive changes which is a particular type of disruptive innovation.

Disruption as has been observed from 'Differentiation' and fast 'time-to-market' is more vigorous in nature, which creates entirely new curves altogether- redefining the market place in such a way that a new set of factors determine profitability and success. As is evident that innovations which help redefining the marketplace is called 'disruptive innovations'; and those merely changing the dynamics within the existing frameworks are termed as 'sustaining innovations'.

**Disruptive Innovations**: These though offer explosive growth but also have the following challenges and risks.

- May Require New Technologies or Core Competencies
- May Not Interest TheCompany's Current Best Customers.
- May Require Completely Different Sales Channels.
- Will Have Unpredictable Sales Volumes and Profits.
- Cannot be Evaluated by NPV (Net Present Value) Analysis.

**Sustaining Innovations:** These are that improvements that build on existing technology, product/ services, market –strategy etc. (this is also referred as incremental innovations). Sustaining Innovations apply existing core competencies and indicate:

- Offer only modest to moderate improvement in cost per unit.
- Have low risk of failure.
- Can be quickly copied and commoditized.
- Can be evaluated using NPV analysis.
- Create growth in revenue and shareholder's value
- Would pass through existing channels.

**Lead Time Gap:** Most industries / companies face a basic problem the time taken to procure,

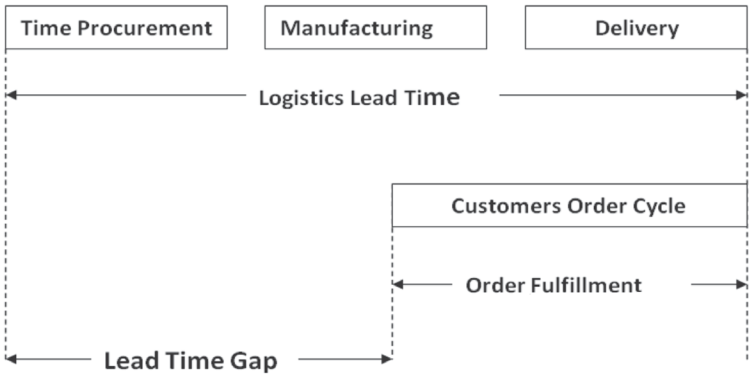


**Figure 1: The Lead Time Gap**

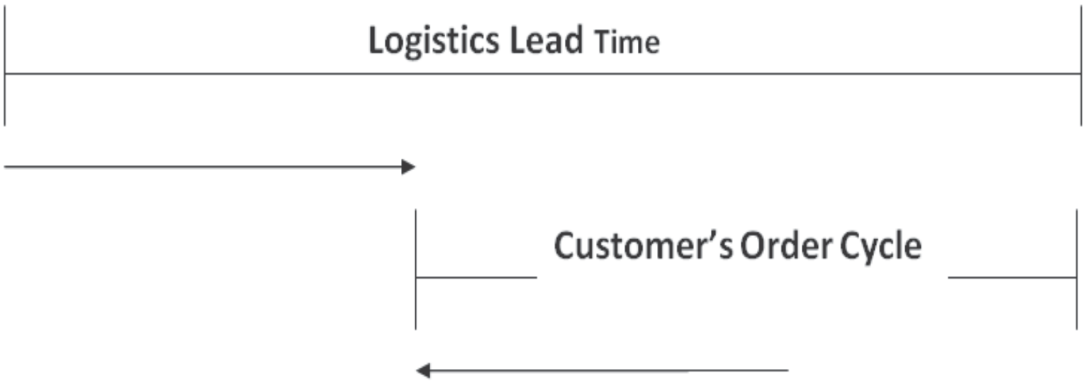


**Figure 2: Closing the Lead-Time Gap**

make and deliver the finished goods/ product to a customer is longer than the time customer prepared to wait for it. This is the basis of lead time gap, which is explained by Figs. 1 and 2. (Christopher, 2001).

From the customer's viewpoint there is only one lead time- the elapsed time from order to delivery (OTD). Clearly this is a crucial competitive variable as more and more markets become increasingly time competitive. Whilst clearly zero -lead times are hardly likely to exist in the real world (practical world practice), the target for any organisation should be to reduce lead times, at every stage in logistics pipe line, as close to zero as possible.

From Figure 1, it is evident that customer's order cycle refers to the length of time that the customer is prepared to wait, from when the order is placed through to when the goods are received. This is the maximum period available for order fulfillment.

In the conventional organisation the only way the gap between the 'logistics lead-time '(i.e. the time taken to complete the process from goods inwards to delivered product) and the 'customer order- cycle' (i.e. the period they are prepared to wait for delivery) is by carrying inventory and forecast management. It can be retorted that all mistakes in forecasting end up as an inventory problem, whether too much or too little.

The company that achieves a perfect match between the logistics, lead time and the customer's required order cycle has no need of forecasts and no need for inventory. Now the challenge for logistics management is to search for the means whereby the gap between the two lead times can be reduced if not closed (Refer Figure 2).

Reducing the gap can be achieved by shortening the logistics lead time (end-to- end pipe line time) whilst simultaneously trying to move the customer's order cycle closer by gaining earlier warning of requirements through improved visibility of demand (Christopher, 2001).

**Law of Lead Time**: Law of Lead Time can best be explained by Little's Law equation (after the mathematician, who first proved it in 1961.):

$$\text{Average Lead Time of any process} = \frac{\text{Number of Things-in- Process}}{\text{Average Completion Rate}} \quad \text{--------(2)}$$

In manufacturing 'Things – in – Process' is 'Work-in-Process' (WIP); in product development it is the number of 'projects – in – process' for service it can be 'number of work items in

process' (job requests, files, invoices etc.). For any single innovator, it is the no. of 'tasks-in-process'. The average completion rate is simply how many of the 'tasks- in- process' the employee can complete per week or month on average. From the graph at Figure 3, it can be observed that: If we have no control over the number of 'projects –in-processes' we have no control over the lead time.

Figure 3 also depicts that there is a simple relationship between the number of active projects or tasks in process and lead time- the more active projects, the longer time it takes to complete all projects.

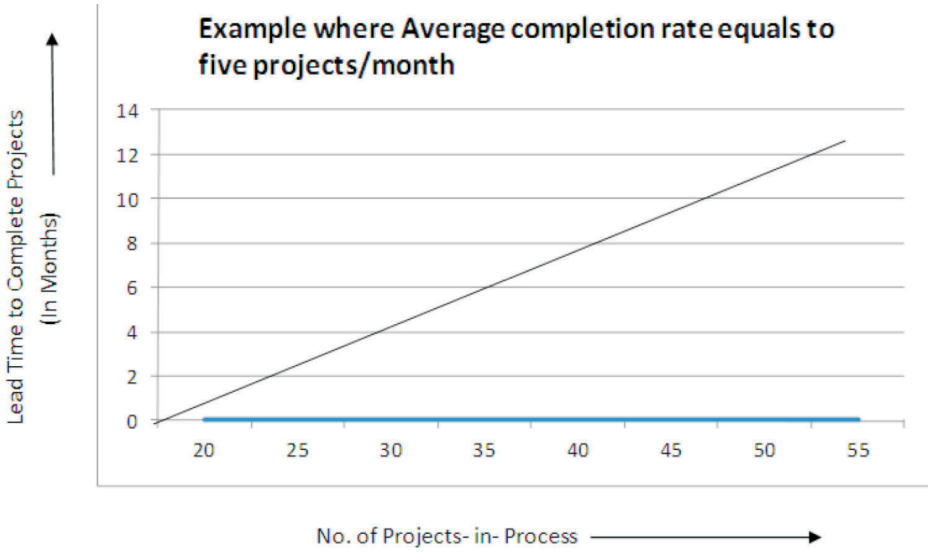


**Figure 3: Relationship between Projects-in-Process and Lead Time**

**Strategic Flexibility:** Sushil (2000), Pathak *et al*. (2006; 2007) have amply defined 'flexibility' and its various manifestations. Simply flexibility is opposite to rigidity, and is agility, versatility as well as robustness, and can be defined as:

- **Flexibility:** "Flexibility is the ability to change or react with little penalty in time, effort, cost or performance." (Sushil, 2000)

Or

Flexibility is defined as "Changing within the existing constraints" (Raynor, 2007).

Fast strategy (Doz *et al*. 2008), calls flexibility as agility. Strategic agility and strategic flexibility are synonymous, and is defined as:

***Strategic Flexibility*** "is an approach that allows organisations to prepare effectively for a future they cannot predict." "Also it encompasses 'strategic uncertainty', which is the ability to change strategies, which is something made largely possible by the commitments required for success." (Raynor, 2007)

Or

"Strategic Agility is about the capability to think and act differently". (Doz *et al*., 2008)

***Strategic Flexibility*** is firm's intent and capability to identify major changes in the external environments, to create option, bundles of product development resources, and to ensure the

sustained competitive advantage of the firm". (Pathak, 2009: Agnieszka *et al*. 2011, Wang, 2005).

Or

***Strategic Flexibility*** can be defined as "an organization's capability to identify major problems/ changes in the external environments, quickly mobilise the resources to new course of actions in response to those changes, and recognize and get promptly when it is time to halt or reverse existing resource commitments." (Pathak *et al*. 2009a)

Strategic flexibility has the following framework or components:

- Anticipate multiple scenarios;
- Formulate strategies for each;
- Acquire and accumulate the capabilities to execute those strategies;
- Operate or execute the most likely strategies;
- Be prepared to rapidly adopt one of the alternatives, if market forces dictate.

**Strategic Paradox:** "Strategies with the greatest possibility of success also have the greatest possibility of failure. This is further amplified by a verdict. A compelling vision, Bold decision, Motivated leadership, Bold decisive action, A deliberate planning etc. unfortunately all these prerequisites of success are almost always the ingredients of failure too. Managers make the choices or assumptions about the future which they cannot predict. It is this collision between commitment and uncertainty that creates the 'strategy paradox' ". Strategic flexibility has a significant role in the flexible performance design.

Prahlad *et al*. (2008) has suggested an approach about future planning as 'Folding-in-the future'. As is evident no organisation knows future of 10-15 years hence, or may not be able to extrapolate the past or the current state of affairs. Therefore, it is prudently suggested that a 'long- term focus' with 'short- term' demonstrated ground actions will be the essence of organisational transformation.

## Designing Flexible Performance Targets

Flexible performance target designing is a key parameter of 'fast innovation'. Fast innovation delivers highly differentiated offerings to the market probably in half the time of the competition than slow or normal innovation process. It is generally impossible for customers to specify completely and precisely, correctly the exact requirement of the product before trying some versiol of the product. Herein, fast innovation technique / methodology reduces the lead time as well as improves accuracy through differentiation, speed- to-market and disruption activities. In this way OTD (on-time-delivery) to the customer takes place as well as delight the customer.

It will be observed that 'Flexible Performance Target Design (FPTD) seeks to achieve the best possible design that meets the maximum number of customer delighters within the required time-to-market deadlines (George *et al*., 2005). FPTD is different than the traditional design approach including concurrent engineering (CE). We know that concurrent engineering approach is better than formal approach as it inserts formal feedback reviews, checks and modifications. But CE also lacks co-creation of customer value and experience as well as 'evolvability'. (Prahlad, 2004)

## The principles of FPTD are as under:

- It is based on VOC(Voice of Customers) and VOB (Voice of Business) and the flexible approach.

- Understanding the intended needs providing outlines of specifications**:** All the ethnographic inputs and then add more details during developments.
- Allow specifications to emerge or evolve with time**:** The specs emerges due to co-creation of customer value system and experience as well as 'evolvability' embedding intelligence in the design for faster mid-course corrections/changes and further expectations. Even modular smart design techniques are welcomed flexibly.
- Early freeze re-used design elements delay the freeze for critical differentiation**:** All specifications ultimately must be finally frozen for a release of the product. Fast innovation techniques like Laws of Lead Time and closing the gap, designing for 'Lean

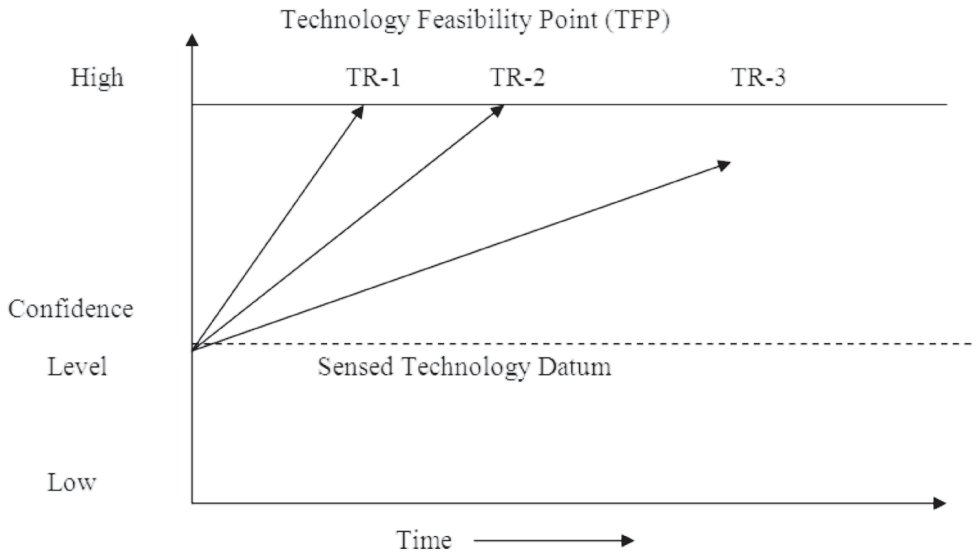


**Figure 4: Representation of Feasibility Point**

'Six Sigma' principles' applying the 'Innovation Blitz' (discussed in the subsequent next paragraph). This ensures all the three dominant dimensions of innovation: differentiation, fast time-to-market and disruptive techniques to be inbuilt.

- **Technology Management – Understanding the Technology Feasibility Point (TFP):** McGrath (1996) recommended that at some point and shortest lead time (Figure 4) wherein all the technical uncertainties or risk elements are smallest and controllable enough for product development (customer can never be satisfied fully) TFP gives a better product – a best fit result (TR1- Technology Review). The Technology Feasibility Point (TFP-TR1) Refer Figure 4, is the agreed upon confidence level that defines the end of a technology development programme at TR1 of the final product / service / offering.

**Innovation Blitzkrieg**: Innovation Blitzkrieg is probably the last step of the 'fast innovation' techniques and differs from 'slow innovation' in the sense that this model has the shortest lead-time, designed for lean six-sigma and finally obeys most of the rules of disruptive innovations (Refer Figure 5). This fast innovation technique, thus offers more offerings than slow innovation process and also satisfies customer experientially- co-creation of value-based customer's expectations.

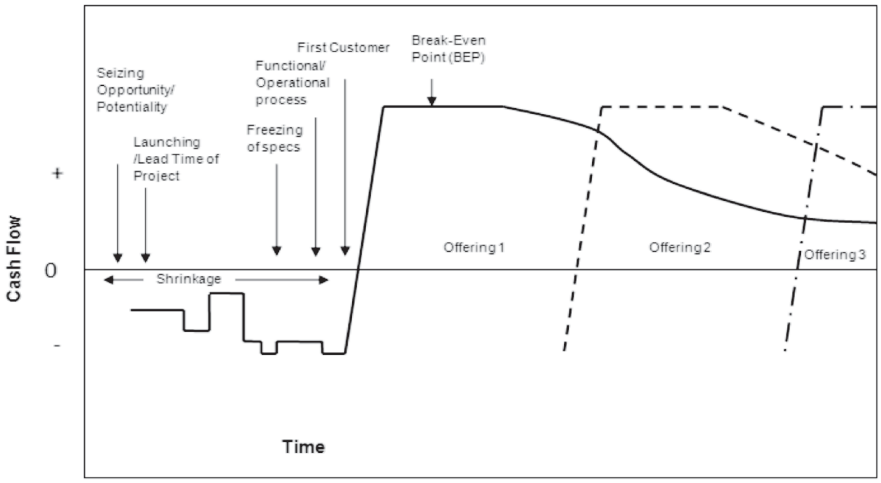


**Figure 5: Innovation Blitzkrieg Model**

The Innovation Blitzkrieg Model (Shreya, 2012, George *et al.*, 2005) distinctly depicts the following salient parameters:

- Ethnographic observations of customers and focusing on three innovative parameters.
- Opportunities are to be grabbed.
- Early freezing specs and later during developmental stage and finally freezing of specs as per technology feasibility point (TFP),- late freezing specifications is the crux of process.
- Shortening of lead-time and closing of the lead- time gap as early as possible.
- Flexible performance target design and innovation blitzkrieg help in achieving desired product efficiently.
- Designing for 'lean Six-Sigma'.
- Thus many offerings are provided to the desired satisfaction of customers.

Apart from the above salient points Innovation Blitzkrieg has the capability to generate further manifestations of disruptive offering.

### How Flexible is the Flexible Performance Target Design

Herein an integrated team of designing, inspection and customer they work right from very beginning with 'evolvability' i.e. embedding intelligence in the design for catering futuristic modifications / mid-course corrections etc. Some other significant parameters are:

- Customer requirements / reactions are catered right from very beginning.
- Various 'Review Teams' and sub-groups work who do the design validation / changes etc.
- Timing of final freezing of specification is also flexible and in our control – designs control
- Also evaluation of additional developmental time for creating delighters / satisfier from the customer's angle is done.

- Process and intermittent feedback system is the crux of flexibility system approach.
- Even a pilot product sample can be evaluated / tested in presence of all concerned i.e. users, developers, inspection, authorities etc. for final validation.

## Case Study (A) Toyota Flexible Designing

The story of Toyota began with the founder Sakichi Toyoda an inventor and pioneer in the late 1800s in a remote farming community outside of Nagoya with a weaving industry. Later his worthy son Kiichiro Toyoda started "Toyota Automotive Company" during 1929-30. Later Kiichiro formally did engineering in Mechanical discipline to understand the automotive car business unlike his father Sakichi who was the inventor of "Toyoda Automatic Loom Works" and not gone to any engineering colleges or so.

Today, there are books written on "The Toyota Way" and its 14 principles by Liker K. Jeffrey (2011) along with two other best sellers like 'Toyota Talent', and 'Toyota work-book'. Before we discuss the 'Flexible Target Design', the very strong tenets are adhered by Toyota family of manufactures, these are:

- Toyota is serious about long-term thinking strategically.
- Toyota believes in right process and they only will produce right results.
- Value is added to the organisation by developing 'people and partners'
- Continuously solving root problems drives organisational learning
- Toyota Production System (TPS) works on responsibility based rather than task based.
- Productivity is enhanced by eliminating wastivity.
- The knowledge rules of Toyota is

*"Nature and markets make the rules. We profit by learning them",*

*"Every learning is from new mistakes- learn from mistakes and do not make one again."*

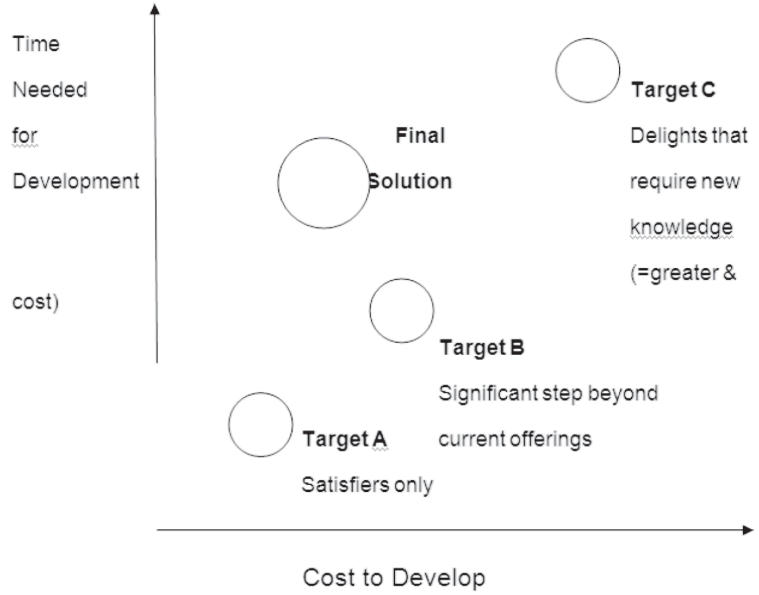


**Figure 6: Flexible Target Design**

Herein Figure 6 it will be observed that Target A is a safe target and Target C provides customer delighters as is desired. Here, the Flexible Performance Target Design (FPTD)

is as a set-based-design (SBD), which gives a great deal of credit for higher performance. In this case study he or she as a chief developer is totally responsible and monitors the project status by continually reviewing prototypes and analyses (as opposed to doing an after the fact review of completed tasks).

Further we observe that in Toyota Production System (TPS), exploring multiple targets (difficult set of specs) simultaneously / concurrently a team can often come up with solutions that were not originally anticipated. Also herein the Chief developer sets the schedule for system level events such as a body-design, related toolings, dies and drive train etc. All sub system working groups know this schedule and strive to those dates.

If a back-up option on hand (probably based on re-use of an existing element) that can be substituted. Even the solution ideas failed, these are not wasted they are stored in archive- as they may be useful for future designs as a breakthrough (and at the least can help prevent future failure too) technology.

### Toyota Case Study (B): Toyota the Power of Partnership

During 1997, 3rd February, on Monday Japan's largest motor manufacturer, Toyota announced that all of its Japanese assembly lines had been brought to a halt following a devastating fire at the premises of one of its affiliated suppliers, Aisin Seiki. This company supplied brake master cylinders for several Toyota models and was its only supplier of brake fluid proportioning valves (Liker, 2004).

The fire had shown up one of the weaknesses of Toyota's famous lean manufacturing system of TPS, (which is opposite to flexibility / no alternative) which runs on minimum stock level, using JIT, Kanban and Genba Kaizen principles. The fire left Toyota only holding half a day's stock of the vital components. Though this was not the first time but during 1995 also when Hanshin earthquake had severed the supply lines of Toyota Kieretsu to components manufacturers in and around the city of Kobe.

Toyota's founder Shoichiro Toyota admitted that the employer's brand of JIT 'is still not perfect', but is convinced that the system is still the best available solution. Harnessing around 20 of Toyota's other affiliated suppliers were asked to rally round, on war footing. The suppliers immediately set about re-tooling, retaining employees and setting up new production lines in co-ordinated fashion to provide the missing components.

And further the reports indicated that by Friday, 7 February 1997, Toyota had restarted assembly lines at all of its plants, successfully restoring the output to 90% of its usual level (Valerie, 1997). Full production was resumed by the following Monday. This case amply justify the flexible manufacturing performance design target as well as that of strategic flexibility of Toyota as such and 'evolvability' at the helm of affairs. This is also the case of co-creation of values, evolvability combined with experiential learning as well as passionate work culture taking the Toyota to dizzy height.

### Case Study 2: Nokia's Strategic Flexibility or Agility Manifestations

Pathak (2009) has discussed about the strategic agility at length and its very manifestations in the technical paper. Nokia has out-manoeuvred Motorola and Ericsson mobile (cell phones) strategically changing its technology from ANALOG to DIGITAL mode and its very many

derivatives. Nokia also enables people to experience music, maps, media, messaging, games, picturing (photography) and many other functions.

As per historical background Nokia was producing forest products, cable, rubber goods (rubber boot or so), chemicals and consumer electronics. It has only been in mobile telephony since 1970s and GSM digital system and handsets products started only during early 1990s. It can be observed that Nokia had a complete success march from 1996-2006, wherein it became the largest supplier of mobile devices with even embedded with digital cameras.

Right from 2004 onwards, the other applications like audio, video, gaming and entertainment miscellaneous items were also a progressive growth trajectory. Now Apple's I-Pod etc. has got the latest configuration than Nokia. But Nokia's mobile phones of the future (1) and (2) on you-tube have got comparable configurations and Nokia in mobile telephony is world-class and a top leader- Nokia 97 has secured an eminent position in the world.

## Conclusion

Connecting strategy to execution building organisational capabilities that allow companies to achieve and further sustaining the continuous change as well as innovation- has been the prime concern of the top management. And this certainly requires ceaselessly strategic flexibility as well as disruptive innovation techniques and customer-centric back-end processes requiring co-creating values (with experience) at a continual pace.

Designing a 'Flexible Performance Targets' precisely means completely specifying a product and freezing the specs later during the developmental process with customer's active participation is the crux of strategic flexible norms. In these processes, shortest lead-time i.e. closing the lead time gap at the earliest are the essence of design. This with further breakthrough technologies and evolvability, co-creation of values of customer and experiential learning decidedly shows the express highways of product developmental benchmark.

The above disruptive innovations and strategic flexibility plus freezing of specs during product developmental continual stage will decidedly ensure the sustained competitive advantage of the organisations.

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