

## Fixes that Fails: in Indian Two-Wheeler Service Sector

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### ABSTRACT

Modern day world is complex and hence, the survival and growth of small organizations depend on how quickly they respond and adapt to the changing scenario. The mortality rate of small and medium enterprises is found to be rising. Managers find it tough to cope-up with pressure in making decisions. They are perplexed to notice that even the bad decisions result in good results. In the presence of non-linearities, delay in cause and effect, and feedback, decision-makers often resort to quick-fixes in the face of a problem symptom. They find the results encouraging. When the symptom reappears, they apply the same proven quick fix and thus fall prey to vicious loop and such a situation is addressed as 'fixes that fail' archetype. Such a situation is identified in two-wheeler service organization. Fixes that fail has been demonstrated and the fundamental solution is proposed in addition to other tactics in handling such scenario. The case study was conducted more than a decade back (2005) during my research work at one of the places in West Bengal. The data, especially, wages seem outdated but, the learning is vital.

### Keywords

Fixes that fail, systems archetype, two-wheeler service, India

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### Introduction

Modern day systems are complex due to the exponential growth in the technology. Complexity refers to the state of being intricate. Moses emphasizing on the internal structure of a system explains two concepts of complexity: Interconnections between the parts of a system and with a nature of these interconnections (Sussman, 2002). The complexity can be described with the number of interactions and interdependence (Saaty and Kearns, 1985) or the number of system attributes (Schoderbek et al., 1990). Forrester (1971) says that complex systems have a multitude of interactions, not simply cause and effect relationships. Senge (1990) says that real world complexity refers to dynamic complexity where cause and effect are subtle and where the effects overtime of interventions is not obvious. Managerial decision making is not an easy task under such an environment. Decision makers suffer from many deficiencies for example, they misperception of feedback (Serman, 2000). In the real world, the cause and effect are distant temporally and spatially. This leads to what Forrester (1971) called it as counterintuitive behavior. Simon (1955) articulated that decision makers exhibit bounded rationality. Tversky and Kahneman (1986) have also demonstrated various shortcomings in human decision-making. System dynamics, a methodology developed based on systems thinking, was developed by Forrester at MIT during 1950s. It has the capability to capture dynamic complexity in terms of non-linearities, feedback, and delays. Its simulation abilities help to a great extent the policy makers. Systems archetypes along with system dynamics help managers to analyze how even good decisions result in undesired side effects (Mohammadi and Tavakolan, 2020). Systems archetypes or generic structures are a class of systems thinking tools that capture common challenges that occur in all kinds of industries and organizations. Generic structures are "dynamic, that support widely applicable behavioral insights" (Paich 1985), "have basic ambition of transfer experience and understanding from one dynamic situation to the other" (Lane and Smart, 1996).

Paich (1985) says that there seems to be two broad viewpoints on generic structures, which differ primarily in their levels of generality:

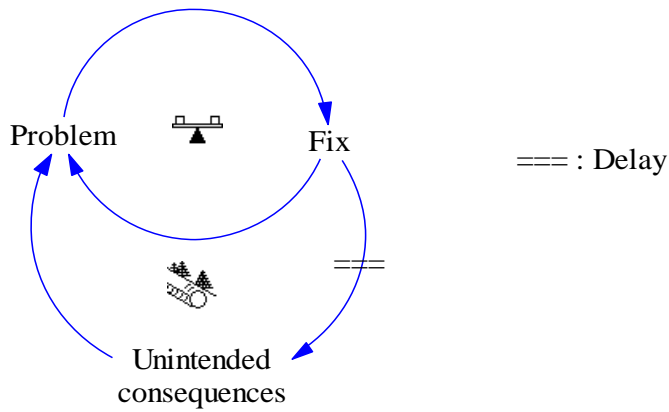
- generic structures are feedback mechanisms that are transferable to new situations within a particular field.
- these are structures that can be transferred across fields.

Identifying, understanding, and practicing such generic structures would enrich the mental models of the decision makers. These have important characteristics in the form of the insights they contain and transferability. Practicing archetypes may sort out some of the micro-level decisions leading to macro-level catastrophe (Senge, 1990).

A case study has been used to demonstrate how the real world managers fall prey to one of the archetypes "*fixes that fails*". This also emphasizes the fact that whether small or large, most of the organizations exhibit similar behavior under the given circumstance.

### "Fixes That Fails" Systems Archetype

The fixes that fail systems archetype's structure consists of a balancing loop and a reinforcing loop. The balancing loop is intended to produce the desired results i.e., to take the system's state towards a desired state. The reinforcing loop, which becomes active after a delay, produces unintended results. This action offsets the results obtained by the action taken in the balancing loop (Kim and Anderson, 1998). The general structure of the archetype is as shown in Figure 1 (Senge 1990).



**Figure 1:** Fixes that fails structure

In the real managerial world this systems archetype starts with a problem symptom viz. declining market share, increasing costs, escalating complaints, and waning profits. The aggravating problem situation induces the managers to act quickly. In the pressure situation, the managers (decision makers) resort to a quick fix, a solution that alleviates the problem symptom. This archetype is a good reflection of the perils of the reductionistic thinking (Braun 2002). *De facto*, the managers face the same problem symptom again after some period. This prompts the decision makers to take the same action or similar action again. Generally, the problem symptom when it appears subsequently will be worse than before (Kim 1999).

Kim and Anderson (1998) explains the dynamics exhibited by this systems archetype in two parts:-

**Intended dynamics:** The problem cries out for a solution, implying that the system is not moving in the intended direction. This is a situation, which indicates that the system is out of control. This dynamics, a balancing loop, encompasses the problem symptom and the quick fix.

**Unintended dynamics:** This actually begins out of sight, meaning, the consequences are not easily observable or noticeable. These surfaces, often, after a delay. The reinforcing dynamics comprises of the unintended consequences resulting from the quick fixes.

The delay factor in the reinforcing loop makes the decision maker remain unaware of the situation. If the delay is too long and the unintended consequences are irreversible, might result in heavy losses such as, loss of customers, loss of good will. The manager is caught in the vicious loop, solving the same problem over and again.

To study this archetype a case of a service organization is considered. A system dynamics model has been developed with problem facing the organization in focus. The development of the model and the model behaviour are discussed in detail in the section that follows.

### The Case Study

An authorised service station of a well-known two-wheeler manufacturer offers servicing of the vehicles. It is a privately owned proprietary concern located in an Indian town. As per the norms of the company, the proprietor deposited Rs. 50,000 initially to get the status of an authorized service station. The manufacturer in turn provided the tools and other accessories essential for

servicing. It has a capacity to serve 10 vehicles per day with 5 working platforms. The employees consist of a supervisor, five skilled labours, and three unskilled labours. The station is located in a rented building measuring around 3000 square feet.

There was a good sale of the vehicle in the town. To remain viable in the booming two wheeler market, the manufacturer increased the variety. Many changes were also brought in their base model. They had started with scooters. Now their product range includes scooterettes, four stroke vehicles.

Mr. Basu, the proprietor, now thought that the business is stable. The labours have gained sufficient experience to render better services to customers. He now decided to increase his profit so that he can payoff the debt of Rs. 50,000 and the interest accumulated on the principle. His desired profit now attained a higher value. He thought to cut down the expenses, so that his profit rises and hence the reduction of the debt. Despite the good sales of the vehicles, the proprietor of the service station seemed to be in panic. Why is he panic? What policies he adopted to cut down the expenses? Did they yield expected results? These are the points of interest for a modeller as well as the proprietor to explore and understand the situation.

After discussion with the proprietor, followed by gathering the relevant data, the system dynamics model has been built.

### System dynamics modelling

The model has been developed with the problem the owner facing in focus. It is built into three sectors namely, Service, Finance, and Customer.

### Finance

The revenue generated in this case is purely on the number of vehicles being served and the charges per vehicle. The additional revenue is also generated when there is a major breakdown of the vehicles viz. engine seize, replacing electronic parts. Such cases are rare when the customers follow the regular servicing schedule. Since such requests are very few in numbers per month, it is assumed in the model that revenue is a simple multiplication of the number of vehicles served per month by the service charges per vehicle. Thus,

$$Revenue = NSRR * Effect\ of\ PSQ\ on\ NSSR * Service\ Charges\ per\ Vehicle$$

(Rupees/Month) ----- (1)

where,

*NSSR* : Normal service requirement rate (Vehicles / Month)

*NSRR* : 250

*Effect of PSQ on NSSR* : Dimensionless

*Service Charges per Vehicle* : INR / Vehicle

*Service Charges per Vehicle* : INR 140

On the other hand expenditures include monthly payment to labour, which include supervisor, skilled labour and unskilled labour, monthly rent, and other overheads. The overheads comprise of expenditures incurred towards electricity bill, telephone charges, office stationery, and miscellaneous expenses. Thus,

$$Expenses = Salary\ Expenses + Overheads + Rent$$

(Rupees/Month) ----- (2)

where,

$$\begin{aligned} \text{Salary Expenses} &= \text{Skilled Labour} * \text{Skilled Labour Salary} \\ &+ \text{Unskilled Labour Salary} \\ &\text{(Rupees / Month)} \end{aligned} \quad \text{---- (3)}$$

Skilled Labour Salary : INR 3000 / Month  
 Unskilled Labour Salary : INR 1000 / Month  
 Overheads : INR 3000 / Month  
 Rent : INR 3000 / Month

**Customer**

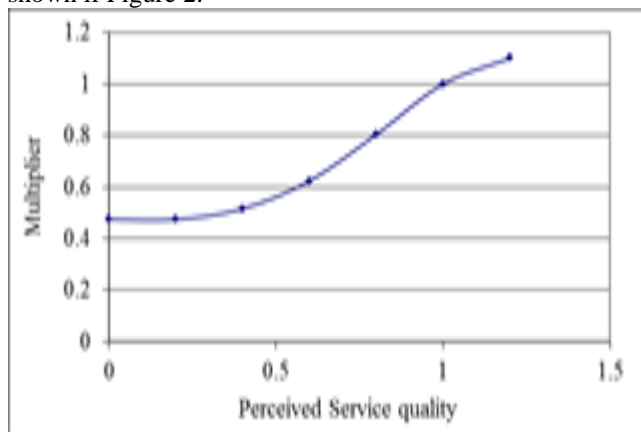
Service sector is highly customer centered. In case of vehicle servicing the supervisor, and labour directly come in contact with the customer. The attention paid in carefully listening to their complaints; identifying and rectifying the faults which are explicitly addressed and unaddressed by the customer plays a vital role. Customers' act in response to the customer care of the serving unit is of high quality. The customer will be happy if the vehicle after servicing runs trouble free till the next service is due. That is the vehicle should be dependable for its intended use till the next maintenance activity is due. Customer satisfaction is an intangible factor hence difficult to measure.

Customer perception of the service quality depends on the actual service quality and the perception delay. Perception delay of 6 months is assumed. This assumption is based on information provided by the proprietor. The rationale is that the average time between services is around 2-3 months. The customer takes an average of 2 services in judging the quality of the service. Thus,

$$\begin{aligned} \text{Perceived Service Quality} &= \text{SMTH1 (Service Quality, Perception Delay)} \\ &\text{(Dimensionless)} \end{aligned} \quad \text{---- (4)}$$

Perception Delay: 6 Months

The effect of perceived service quality on normal service requirement rate is a table function. When the perceived quality exceeds 1, more vehicles than the normal come in for services. If it is below 1, less will be the number of vehicles arriving for service. However, the minimum value is assumed to be 0.474 since there will always be customers coming in for services because of locational advantages, authorisation by the manufacturer, and with the belief that the replacement parts will be genuine. The table function is shown if Figure 2.



**Figure 2:** The Effect of Perceived Service Quality (PSQ) on NSSR

**Service**

The services offered by centre depend on the capability of the workers to handle the demands and requests of the customers. It requires primarily the technical knowledge and expertise to diagnose the problem. If it were a routine service, the problems would be minimal and one just goes ahead with the standard check-up and repair procedure specified by the manufacturer. Labours develop certain skills over a period of time viz. identifying a noise while driving, may be because of the loosened fasteners, spring stiffness, external particles struck in somewhere. To ascertain with certainty the cause requires experience. As the labours go on carrying out the services, they will learn such intricacies. The labours increase through hiring and reduce through retrenchment and normal attrition. Since, Mr. Basu, had retrenched the labour, modelling is done accordingly.

$$\begin{aligned} \text{Skilled Labour (t)} &= \text{Skilled Labour (t - dt)} + (-\text{Retrenchment Rate}) * dt \text{ (Persons)} \end{aligned} \quad \text{--- (5)}$$

Initial Skilled Labours: 5 Persons

The capability to serve depends on the number of skilled workers and the vehicles they can serve per month. On an average each skilled worker can service 2 vehicles per day. Considering the number of working days in a month to be 25, absenteeism, difficulty of the work, power problem it is estimated that each skilled labour can serve 41.67 vehicles per month. Thus,

$$\begin{aligned} \text{Service Capability} &= \text{Skilled Labour} * 41.67 / \text{Initial Capacity (Dimensionless)} \end{aligned} \quad \text{---- (6)}$$

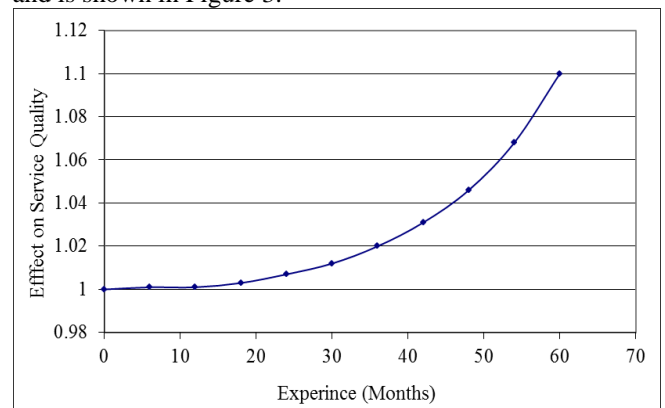
Initial Capacity : 250 Vehicles / Month

Service quality depends on the capability to serve, time to adjust, and the effect of experience. Whenever there is a change in capability to work, getting adjusted to the changed working environment requires some time. Hence the capability is smoothed over a delay period of 3 months. Further, service quality improves as the workers gain experience. Service quality refers in large part to the ability of skilled labours to fix it right the first time (Homer 1999). Thus,

$$\begin{aligned} \text{Service Quality} &= \{\text{SMTH1 (Service Capability, Time to Adjust)}\} * \text{Effect of Expertise on} \\ &\text{Service Quality (Dimensionless)} \end{aligned} \quad \text{---- (7)}$$

Time to Adjust : 3 Months

The quality of service, as explained earlier, depends on the expertise of the experts to identify the problem. This is a function of experience. This is modelled as a table function and is shown in Figure 3.



**Figure 3:** The Effect of Experience on Service Quality

The problem was modelled around the problem facing the proprietor and the actions taken by him. His initial profit was Rs. 10000 per month. He had never accounted his efforts and time spent in managing the centre. Most of this profit goes to managing his family and in part to the development of the centre. But, he had a debt of Rs.50,000 plus the interest. Once he thought that business is stable, his expectations of profit raised. The new expectation is earlier profit plus Rs. 1,500 per month, the instalment amount to the bank. He thought to reduce the labour as they are efficient and can be managed with less and later he cut down his area of the centre to cut down the rental expenses.

$$Profit = Revenue - Expenses \text{ (Rupees/month)} \quad \text{---- (8)}$$

This profit is smoothed over a period of three months to take into account the variations in the business and accounting. Thus,

$$Smoothed Profit = SMTH1(Profit, Profit Smoothing Time) \quad \text{----(9)}$$

Profit Smoothing Time : 3Months

The desired profit and the smoothed profit give the discrepancy between the profits, which actually triggers action in the balancing loop to drive the system in the desired direction. Thus,

$$Profit Discrepancy = Desired Profit - Smoothed Profit \text{ (INR / Month)} \quad \text{---- (10)}$$

Desired Profit : 10000

This discrepancy manifests in the form of pressure to reduce the expenditures. Hence, pressure to reduce expenditure is function of profit discrepancy and the desired profit. Thus,

$$Pressure to Cut Costs = f(Desired Profit, Profit Discrepancy) \quad \text{---- (11)}$$

This in turn decides the number of persons to retrench. It is formulated as a table function, which is shown in Figure 4.

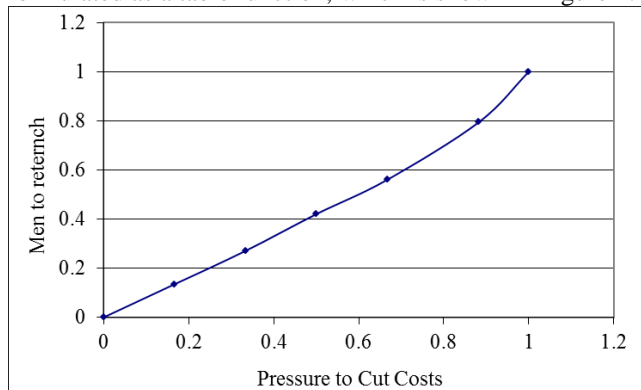


Figure 4: The Effect of Pressure on Retrenchment

As already stated the proprietor also cut down the rental expenses. This is accommodated in the model as,

$$Rent = 3000 \text{ (INR / Month)}$$

The causal loop diagram and flow diagram of the model are shown in Figure 5 and 6 respectively.

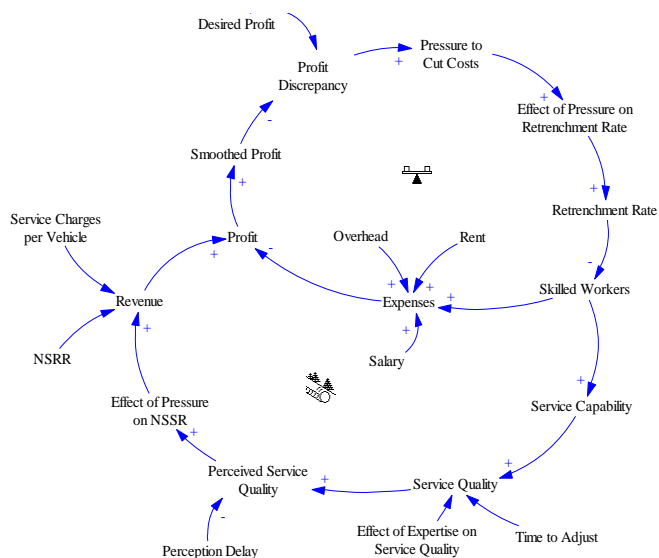


Figure 5: Causal Loop Diagram of the Model

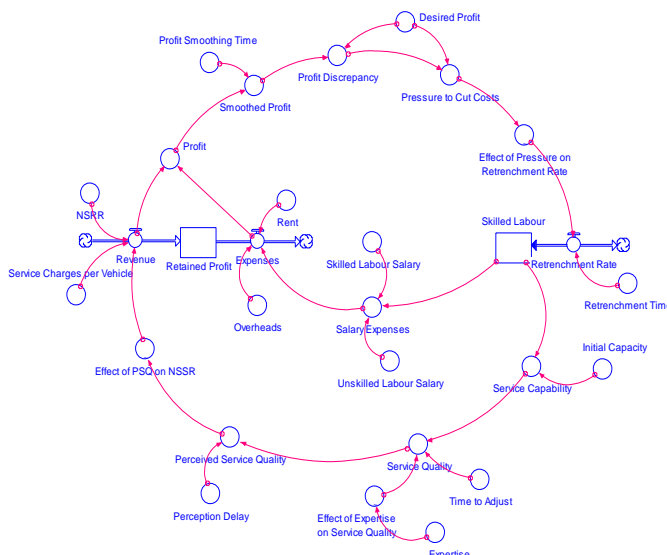


Figure 6: Flow Diagram of the System Dynamic Model

The model is simulated using Stella 5 software for a period of 0-66 months with dt at 0.1month. The integration method adopted is Runge-Kutta 4. The behavior of the system's key variables is shown in Figure 7.

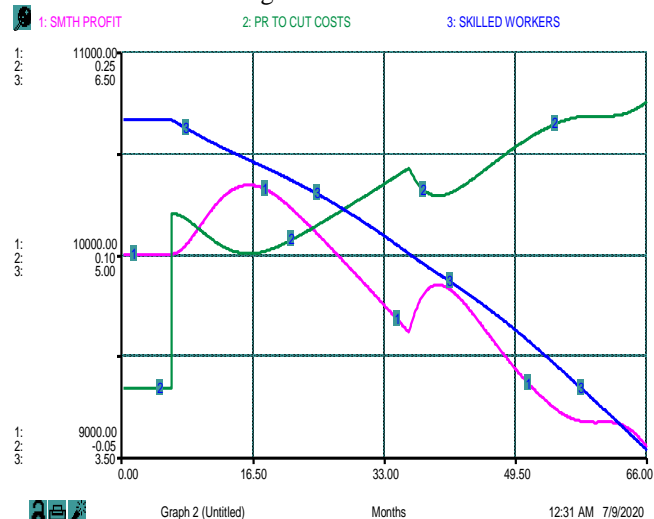


Figure 7: Behaviour of the key variables over time

The rationality behind the proprietor to cut costs was basically initiated for two reasons:

1. He had to pay back the loan of Rs. 50,000 plus the interest accumulated on the principle.
2. His perception of excess staff, i.e., the service capability is more than the demand.

His intention to pay back the loan was logical as the service station was already stable in his opinion. The debt also gets larger with the passing of the time owing to accumulation of the interest. His perception of the excess skilled worker was triggered by the fact that his skilled workers with experience can be more productive with the assistance of the unskilled labor who through observation must have obtained some skills.

With this background and through the experience, policy run is made to find out how he could have met the debt without retrenching skilled workers.

In this policy run no retrenchment is done, in addition his working area is also not reduced. The important factor considered here is the essence of training required for the skilled labor. This factor is a key factor for the reasons mentioned below:

1. The base model was updated
2. New models were introduced
3. The range of product was enhanced
4. The technological up gradation at manufacturing.

There are 6 skilled workers. The manufacturer organizes training every 6 months to highlight the modifications and imparts necessary training to diagnose and remedy the causes. These expenses though partly borne by the manufacturer, the owner on an average has to incur Rs. 1000 per month. This in turn enhances the capability of these skilled labours. The results of the policy run are shown in Figure 8.

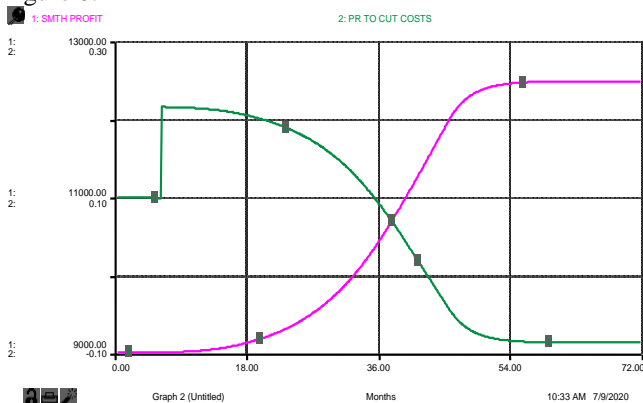


Figure 8: Policy Run

## Discussions

The service industry consists of service activities which are brought to bear on physical objects, human subjects, information or institutional entities in such a way that these are somehow influenced without being physically transformed (Lai et al, 2001). Only one thing matters in a service encounter- the customer's perception of what occurred (Chase and Dasu, 2001). Service is not a physical object and cannot be possessed (Shostack 1984). The customer care is of utmost importance for the survival and growth of the organization. The organizations generally

miss is the customer's relationship to, and interaction with, services. In any service encounter – from a simple pizza pickup to a complex, long-term consulting engagement – perception is the reality (Chase and Dasu, 2001).

Service organizations are generally labor intensive. The skilled and talented labors form an important resource at the disposal of the entrepreneur. These skilled labors have the training and the expertise that is not easily obtainable (Fredendal and Emery, 2003). This point not only emphasizes the need to retain the current skilled labor force but also the essence of training in automobile garages. Learning from the discussions of case studies from many service organizations viz. Peoples airline express, Hanover Insurance, indicate the sustained maintenance of trained labor force.

Homer (1999) discussing field services says that the service quality refers in large part to the ability of field engineers to fix it right the first time, which is a function of the engineer's skill and motivation. Customer perceived service quality has been given more attention for its specific contribution to business competitiveness (Wang et al, 2003). Customer satisfaction with service is a function of both the frequency of service and machine downtime (Homer 1999). Since his discussion was focused on field engineer's ability to respond to customers calls in case of breakdown. This concept of customer satisfaction can be applied to automobile servicing since servicing of the vehicles is carried out on regular basis. Service organizations are becoming more and more complex and chaotic in their operations and behavior (Lai et al, 2001).

The owners need to cut down the costs in the form of reducing labor force and reducing rental charges to compensate for the necessity of repaying the loan indicates his applying the quick fix. His expectations of the desired profit increased by an amount of Rs. 1500 per month. In this situation he has two options, one to increase the revenue maintaining the costs constant or cut down the costs, so that he can realize more profit. His option as already mentioned is to cut down the labor force, implies his reductionistic thinking. When he reduced his skilled labor, as seen in Figure 7, the profits raised. This retrenchment manifested in it self the capability and quality of the service. The downfall of profit has begun only after a delay. Since the quality of service has to be perceived by the customers before it is reflected in revenue generation i.e., further downfall of profit. Here the quick fix is to reduce the labors. The unintended consequences are the capability of the organization due to under capacity and fall of service quality. These side effects surfaced after a delay. As consistent with the literature, he could not trace the cause correctly since the action and the causes were distant.

Subsequently, earlier policy of reducing the labor along with cut in rent payment adopted. This shows the application another quick fix. The quick fixes are two; one is the reduction of labor and the other reduction in work area. Since the benefits of such actions are immediate an increase in the profit can be seen in Figure 7 around 36<sup>th</sup> month. Before applying these fixes, one notice that the problem symptom 'pressure to cut costs' was increasing. After the application fix, the pressure to cut cost again started to mount. This is in line with what Kim and Anderson (1998) said 'when the problem symptom reappears, it may be worse

than before'. This reduced the capability of the service station. Which in turn degraded the service quality. Though the remaining 4 skilled labors had the experience of more than 5 years, the lack of motivation to maintain and interact with the customers had diminished the overall perception of quality on revenue generation. By fixing the problem initially by retrenching labors had put the proprietor in the vicious loop. Which further prompted him to apply quick fixes. The pressure to cut costs was always on the raise albeit the application of fixes. This clearly illustrates 'man is a prisoner of his own'.

His intended action to raise the profit from Rs. 10,000 per month to Rs. 15,000 per month, at the end of 66th month reached even a lower value of Rs. 9,300. The revenue was around Rs. 35,000 in the beginning, has slipped to a value of around Rs. 27,000 per month at the end of 66<sup>th</sup> month. The skilled labor force remained at a value of 4 signifying the fall in capacity of the service station. It can be inferred that the reduction in capacity as the unplanned decision.

In the policy run, as already stated, no reduction in the labour force and no cut in the rent, but with a focus on training the labours with an intention of realizing more revenue than before to pay back the debt. Trained and experienced labour force is adept at doing things efficiently and effectively. They can identify the problem and repair it in one go, resulting in less rework. The reliability of the vehicle will be higher resulting in customer satisfaction. After all the customer wants his vehicle reliable on his way of journey. The training programmes are not only designed to impart the technical aspects of the services but also the behavioural aspects. The behavioural aspects include the way to handle different kinds of complaints when customer is unable to express explicitly. This helps not only in retaining the existing customer base but also widens the customer base through word-of-mouth. This is just another alternative the proprietor could have pursued. The total monthly expenses increases by Rs. 1000. We assume that the proprietor does not pay either the principle or the interest till month 33. Since with this policy smoothed profit exceeds Rs.10,000 in 33<sup>rd</sup> month. From month 0 to 84, the total debt would amount to Rs.1, 09,748 assuming an interest rate of 14%. If, he starts paying an amount equal to smoothed profit minus Rs. 10,000. By 84<sup>th</sup> month the total payment amount will be Rs.1,07,000. He could have come out of the debt by the year ending 7, simultaneously fetching an average profit of Rs. 12,500 per month. It is also evident from Figure 8 that the pressure to cut costs never increased. That means the problem symptom never appeared indicating the policy adopted is a fundamental solution not a reactionary policy adopted. The perceived service quality of the service station at year ending 7 is touching a value of 1.4. This indicates almost 40% raise in the revenue than the normal and a wider customer base.

As some researchers say, when a single person manages the business, he may not know all the things related to the business. Bianchi and Bivona (2000) addresses the difficulties of a family owned businesses when the cash flow is used to meet needs of both the business and their family needs.

## Conclusions

From the case analysis and policy run it is clear that how a small organization with a manpower of just 8 fell into the trap. In a proprietorship organization all the activities like planning, accounting, directing are done by the proprietor himself. He may not know everything of the business. His own limitations can manifest in many ways in the organization. System dynamics with its capability to capture soft variables incorporate non-linearities and delays unearth the underlying problems. Decision makers can allocate the resources in a most efficient and effective way. It helps managers to understand how the amount of corrective action and the time delays in interconnected systems can lead to downfall of an organization.

There was no external entity, which forced him to fall into the trap. It was the owner himself, who caused the debacle. His intentions to pay back the debt can be well appreciated. The policies he adopted highlight his myopic tendency to take decisions. His taking decisions under pressure illustrate his reactionary attitude. The decision makers instead of acting under pressure, should act on established management principles. They must take time and explore the possible consequences, and side effects emerging out of their actions in long-term perspective. But the way he tackled the situation was lead him to systematic errors. This exemplify what Senge (1990) addressed the need to 'stay focused on long-term goals' management principle under such situations.

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