

## **7s Model: Operation Department Transformation of Malaysia Sheet Glass (NSG Group)**

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### **Abstract**

Malaysian Sheet Glass (NSG Group) responds to the everchanging business environment by putting an effort to do transformation at the operations department. McKinsey 7-S Model is chosen since the model able to asses a company's competitive and strategic position. The model proposes seven key points should be in alignment: strategy, structure, systems, staff, skills, style and share values. Interview session conducted with the Plant Manager, Ghazali Ab Rahman and other analysis, showed that MSG strategy needs some alteration as the field of competition is fluctuating with the ASEAN Trade in Goods Agreement (ATIGA) came into force in 2015. The systems of MSG need enhancement in order to avoid wastage and increase efficiency. MSG staff's are well trained and skillful but they need upskilling for their performance in order to increase the efficiency. Style and share values are MSG forte. Recommendations suggested to transform the performance and efficiency of MSG. MSG need to manage the constraints in their system. MSG is recommended to optimize it processes, workforce, energy consumption efficiency, to manage lower cost of quality, to lower the cost of regulatory compliance and to manage inventory carrying costs in order to drive a better efficiency in its manufacturing operations. To better manage the transformation, three approaches are recommended including top down, bottom up and core process.

### **Keywords**

McKinsey 7-S, Malaysian Sheet Glass, Manufacturing Operations, Transformation and Automotive Glass.

## Introduction

The case takes place in Malaysian Sheet Glass (MSG), a subsidiary of Nippon Sheet Glass (NSG). The glass manufacturing industry in Malaysian landscape is changing in a complex environment with a fast growing number of new competitors and the changing of market needs. Maintaining a competitive edge against competitors and maintaining the market share is a critical issue for MSG. There is a need for MSG to improve its service and performance. This article demonstrates how the McKinsey 7-S Model can be utilized to assess a company's competitive and strategic position. The McKinsey 7-S model showed how it helps to make transformation in an organization.

Encik Kamarulzaman is the leader of the transformation team which is formed by the top management of Malaysian Sheet Glass (MSG) to resolve the organizational issues regarding the company's operation. The transformation team is dedicatedly assigned by the MSG's top management to make a transformation in the organization internally.

They also had known as a change agent in MSG and supposed to make change to the way of working culture in MSG in order to be a competitive and effective organization. On 7<sup>th</sup> June 2017, Encik Kamarulzaman has been called by the Encik Ghazali, the Plant Manager of MSG. Encik Ghazali has assigned Encik Kamarulzaman a special task to address the issues in the Operational Department under his supervision. Encik Kamarulzaman and his team must analyse the problem and take a holistic action plan to resolve this issue and transform the organization to be effective and competitive.

Malaysian Sheet Glass Bhd manufactures flat glass and automotive glass. The Company produces clear float glass, tinted float glass, figured glass, and reflective glass. Malaysian Sheet Glass Bhd is located in Malaysia. As of November 2003, Malaysian Sheet Glass Berhad is a subsidiary of Nippon Sheet Glass Co. Ltd.



Figure 1:

Sungai Buloh Plant

Founded in 1918, NSG acquired the leading UK-based glass manufacturer Pilkington plc in June 2006. Today, the company has combined sales of JPY 580.8 billion, with manufacturing operations around the world and sales in over 100 countries, employing some 27,000 people worldwide.

### Malaysian Sheet Glass Berhad

This company was founded in November 1971 by Jiro Kawase who became the president of NSG when he joined with several Malaysian investors to establish Malaysian Sheet Glass (MSG), the only plate glass manufacturer in Malaysia. The company began producing sheet glass and figured glass two years later. The company is based in Sungai Buloh, Malaysia with an additional office in Kuala Lumpur, Malaysia.



Figure 2:

### History of Sungai Buloh Plant

Malaysian Sheet Glass Berhad provides glass manufacturing and marketing services through its subsidiaries. The company offers flat, silvered mirrors, automotive and industrial safety, and clear float glass. Its subsidiaries include Glass Marketing Company Sdn. Bhd., Malaysian Mirrors Sdn. Bhd., and MSG Safety Glass Sdn. Bhd.

### MSG Values and Principles

MSG has outlined its values and principles in their daily operations. They aim to be judged as best in class by:

- Our Customers - to be their preferred supplier for glass products and related services
- Our Employees - to be their preferred place to work
- Our Shareholders - to be their preferred long term investment

- Our Suppliers - to build strong mutually beneficial relationships based on trust, co-operation, innovation and sustainability
- Our Communities - to be a good neighbour, wherever we operate
- Our Guiding Principles

MSG will achieve success by:

- Ensuring that all our actions add value and make our company sustainable
- Being obsessed with safety, in the belief that all accidents are preventable
- Following the highest standards of social and environmental responsibility in everything we do
- Developing the potential, motivation and commitment of every individual
- Achieving defined quality standards to satisfy all our customers
- Staying ahead by constantly developing advanced technologies, innovative products and applications
- Making decisions based on data, facts and analysis, working closely with operations, development and commercial teams
- Exploiting synergies and eliminating waste, to ensure competitiveness
- Striving for continuous improvement - in all our activities

### ***Nation spread***

Currently, they are the leading share of the global Original Equipment (OE) and Specialized Transport markets. It is important to note that they are the largest player globally in automotive aftermarket glazing distribution and wholesale.

The main products of MSG Automotive Manufacturing are related to automotive glass include Absorbing Solar Control, Infrared Reflective Solar Control, Heatable Glazing, Hydrophobic Glazing, Integrated Antennas, Tinted Automotive Glazing, Laminated Sideglazing and Glazing Systems.

Through restructuring of its established facilities and the establishment of new ones in the fast developing markets, Automotive continues to match its asset base to regional demand, both in terms of volume and, equally as important, technical capability and service.

### ***Market and Growth***

Utilising its global R&D and global account management structure, Pilkington Automotive's market-focused approach to development of products and services ensures that it delivers the glazing solutions its customers want, in a timely fashion to the appropriate regions. Automotive

glass usage in Malaysia market consists of Automotive (10%), Original Equipment (80%), and Replacement market (20%).

### **MSG Advantage**

Strong automotive market position in Malaysia is one of the advantage for MSG. The Automotive business of the MSG is the largest supplier of automotive glazing products. In serving the Original Equipment (OE) market, automotive operates a global key account network, matched to the organisational requirements of its customers. Automotive operates automotive glass fabrication plants in Sungai Buloh.

Through restructuring of its established facilities and the establishment of new ones in the fast developing markets, Automotive continues to match its asset base to regional demand, both in terms of volume and, equally as important, technical capability and service.

MSG as a subsidiary of NSG Group operate automotive global business which is fully integrated and managed on a global basis. This organization enables optimization of the NSG Group's global asset base across its business segments.



Figure 3:

Sales Distribution

### **Market recognition**

MSG has a strong market recognition especially in automotive particularly involving Original Equipment. Most of MSG's OEM production is focused on the volume light vehicle industry, serving the Malaysia's major vehicle manufacturers. MSG operates automotive fabrication facilities in Sungai Buloh.

### Aftermarket (AGR)

This company has a well developed aftermarket distribution and wholesale networks throughout Malaysia. MGS products can reach end-users in the aftermarket by one of two main routes: through its own distribution chains, supplying independent retail fitters, or through vehicle manufacturers' dealer networks (Refer to figure 3).

### Competitors

The recent success and continuing growth of the glass manufacturing segment has caught the attention of the major players, who have themselves launched products to capitalize on the growing glass segment and also to capture the business of consumers seeking different type and style of glass. In response to consumers' demand, the major players and new entrants venture in the business in Malaysia. The three major competitors including Saint-Gobain from France, AGC Flat Glass (Thailand) PLC based in Japan, and Asahimas Flat Glass.

### Challenges

The success of Malaysian Sheet Glass as the main automotive glass and distribution business in Malaysia is due to the company strength in manufacturing, marketing, and distribution, as well as their pricing power. MGS has the competitive edge against competitor in Malaysia before 2015. In 2015 under ATIGA, glass producers from ASEAN countries namely Thailand and Indonesia can enter Malaysian market with tax. The business issue and challenge for MSG is can it maintain the competitive edge the new competitor. This main issue lead to the other important issue, is MSG is able to maintain its Malaysian market and share and be able to penetrate the ASEAN market.

<b>Malaysian Sheet Glass Sendirian Berhad (Incorporated in Malaysia)</b>					
<b>Statements of comprehensive income For the financial year ended 31 March 2016</b>					
	<b>Note</b>	<b>Group</b>		<b>Company</b>	
		<b>2016</b>	<b>2015</b>	<b>2016</b>	<b>2015</b>
		<b>RM</b>	<b>RM</b>	<b>RM</b>	<b>RM</b>
<b>Revenue</b>	4	397,372,705	384,340,270	395,701,638	381,798,633
<b>Cost of sales</b>	5	(322,587,603)	(306,094,062)	(322,078,866)	(304,260,113)
<b>Gross profit</b>		74,785,102	78,246,208	73,622,772	77,538,520
<b>Other income</b>	6	1,311,713	1,373,966	877,159	947,504
<b>Distribution expenses</b>		(31,272,745)	(32,614,500)	(31,410,296)	(32,826,063)
<b>Operating expenses</b>		(35,011,475)	(26,654,693)	(32,021,046)	(25,417,001)
<b>Other expenses</b>		(1,775,749)	(1,619,267)	(1,905,526)	(1,522,539)
<b>Finance costs</b>	7	(3,317,128)	(2,827,210)	(3,317,128)	(2,827,210)
<b>Profit before tax</b>	8	4,719,718	15,904,504	5,845,935	15,893,211
<b>Income tax expense</b>	11	42,267	(2,555)	23,775	(2,555)
<b>Profit, net of tax</b>		4,761,985	15,901,949	5,869,710	15,890,656
<b>Other comprehensive income:</b>					

Figure 4:

MSG Statement Income FY2015 – FY2016

Figure 1 is the statement for comprehensive of MSG, the profit net for FY2015 is RM15,890,656 but the profit decrease to 5,869,710 for FY2016. The margin for profit decrease is enormous. The decrease is around RM10,000,000. This is due to the increase of operation cost, other expenses and finance cost.

With the new challenges, MSG has to look into its production efficiency. There are issues and challenges need to look into such as the weak organization alignment, the processes and the skill of the production team.

### 7-S Model

A clear understanding of a firm's competitive position is essential for facilitating growth and achieving high levels of performance. Such clarity is particularly important for firms that are competing in emerging industry segments where the environmental dynamics are typically quite turbulent and ambiguous. One framework that has been widely used to assess a firm's competitive position is the McKinsey 7-S framework. The premise of this model is that the seven "S" factors contained in the model must be aligned so that a company may effectively cope with the myriad of competitive forces that affect performance.

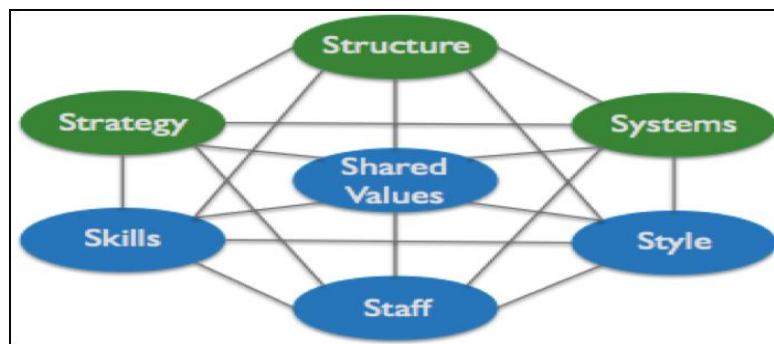


Figure 5:

### 7-S Model

This model provides a framework that allows a structured analysis of a company's competitive position. In this paper we demonstrate a 7-S analysis by presenting the results from a case study of the Malaysian Sheet Glass (MSG), which examines the relative importance of the 7-S factors. MSG is competing within a new, growing, and increasingly challenging segment of the glass sector.

Encik Kamarulzaman and team challenge the focus on alignment of the 7-S factors, and demonstrate a multi-level model that accounts for the differential impact and importance of the various 7-S factors. By doing so, Encik Kamarulzaman and team offer a more detailed

explanation of how the 7-S framework can be used to better understand a firm's competitive position, and demonstrate how this framework can be applied to improve decision making effectiveness and efficiency and, indeed, offer a prescriptive analysis.

Encik Kamarulzaman and team begin by presenting an overview and critical analysis of the 7-S framework, followed by a discussion of the primary competitive challenges within the craft brewing segment. Next, using the 7-S model to analyze the competitive position of the Malaysian Sheet Glass, they discuss the roles and relevance of each factor. The results demonstrate support for a conclusion that four of the 7-S factors are aligned and germane to MSG's competitive position. Encik Kamarulzaman and team conclude by offering a contingency explanation of the 7-S model that can be applied and validated in other glass contexts and segments.

### ***The 7-S Framework***

The 7-S framework is a diagnostic model that attempts to identify the factors that are necessary for effective strategy execution. As we said above, the model is predicated on the principle that the seven factors are inter-related and must be aligned to enhance and optimize organizational performance.<sup>2</sup> Exhibit 1 presents a graphical representation of the model.

Three of the factors strategy, structure, and systems are known as hard Ss. Strategy reflects the planned or intended actions of the firm for responding and adapting to the competitive influences in the external environment. Structure represents the coordination mechanisms of the firm and is defined by the division of tasks and labor, as well as the hierarchy of power and reporting relationships. Systems are the mechanisms used to manage organizational processes and procedures, such as financial planning and internal controls, staffing and performance management, and information technology.

The remaining four factors, called the soft Ss, are staff, skills, style, and shared values. Staff describes the individuals who perform the work of the firm—their backgrounds, experiences, and capabilities. Skills reflect what the organization does best—the collective competencies that are utilized to manage organizational systems, processes, technology, and customers. Style represents the culture of the firm and is characterized by collectively held assumptions, values, and normative behaviors. The shared values factor, which is at the center point of the model, reflects the superordinate goals of the firm and provides employees with a sense of purpose.

As noted above, the 7-S model is widely used in practice and considered to provide a robust approach for examining organizational alignment. Strangely, despite the length of time since the model was introduced, little evidence supports the utility and veracity of the framework, although a few studies have examined the content validity of the model. For example, some scholars have argued that the model omits consideration of variables that should be included, such as strategic execution, which reflects the primary outcome of the alignment among the other



7-S factors. However, most scholars and practitioners have apparently assumed the model's validity and simply utilized it as a guide to inquiry.

Although Encik Kamarulzaman and team question the premise that all seven factors may be equally relevant, they adopt the framework for the following reasons. The efficacy of the 7-S model has been supported indirectly by research findings across several academic disciplines. For example, studies published in the economic and strategic management literatures, including some that have focused on the glass industry, have shown that the alignment among the three hard Ss has a significant influence on firm competitiveness.

In addition, there is evidence in the human resources, organizational behavior, and psychology literatures regarding the integrative requirements among the soft Ss for promoting firm performance. For example, there is fairly strong and consistent evidence that the alignment of key policies, practices, and procedures

Given that the 7-S model does not specify the contingencies that may dictate the relative importance of the various 7-S factors, Encik Kamarulzaman and team wanted to see which of the factors might be most salient for a relatively new company. To address this gap and provide insights regarding the use and utility of the 7-S framework, they used the model to examine the organizational alignment and competitive position of the Malaysian Sheet Glass, a successful company that is competing in a growing and increasingly challenging segment of the glass industry.

Based on this analysis, Encik Kamarulzaman and team identify the primary 7-S factors that appear to be critical for managing MSG's current competitive challenges and sustaining longer-term growth, and in turn, may have applicability to similar firms operating in similar environments.

### **Research Methodology**

Two primary sources of data were gathered and analyzed for this case study; first-person interviews and secondary sources. Encik Kamarulzaman and team also conducted a benchmarking assessment. Encik Kamarulzaman conducted semi-structured interviews with Ghazali Abraham, Plant Manager of MSG. Questions focused on each of the 7-S factors.

Examples include, "How would you describe MSG's current business strategy?"; "How would you characterize the culture at MSG?"; and "What are some of the things that you, as a company, do very well?" Responses were reviewed and interpreted using an independent coding procedure in which Encik Kamarulzaman and team: (a) assigned content themes to interview responses associated with each of the 7-S factors; and (b) compared the extent of agreement regarding the nature and importance of the themes. Inter-rater agreement exceeded 90 percent; remaining discrepancies were resolved through consensus-based discussion.

Secondary sources of data included web and print based information and collateral.<sup>15</sup> The findings of the secondary research and benchmarking complement the interview results by offering additional insights regarding the nature and importance of the 7-S factors, and demonstrate the differential relevance of the various “hard” and “soft” characteristics for this company.

The following steps is used in helping Encik Kamarulzaman and team to apply this tool:

Step 1. Identify the areas that are not effectively aligned During the first step, the aim is to look at the 7S elements and identify if they are effectively aligned with each other. After the questions answered the team look for the gaps, inconsistencies and weaknesses between the relationships of the elements.

Step 2. Determine the optimal organization design With the help from top management, the team second step is to find out what effective organizational design to achieved. By knowing the desired alignment you can set your goals and make the action plans much easier.

Step 3. Decide where and what changes should be made This is basically the team action plan, which will detail the areas they suggest to realign and how would they like to do that.

Step 4. Make the necessary changes The implementation is the most important stage in any process, change or analysis and only the well-implemented changes have positive effects.

Step 5. Continuously review the 7s The seven elements: strategy, structure, systems, skills, staff, style and values are dynamic and change constantly. A change in one element always has effects on the other elements and requires implementing new organizational design. Thus, continuous review of each area is very important.

## **Analysis and Findings**

### ***Strategy***

In May 2014 the Group announced its Long-term Strategic Vision. The strategic vision is to transform the NSG Group into a VA (value added) Glass Company. It believe that the Group will be able to create shareholder value by focusing on producing innovative and technologically advanced glass products and thus improving financial performance.

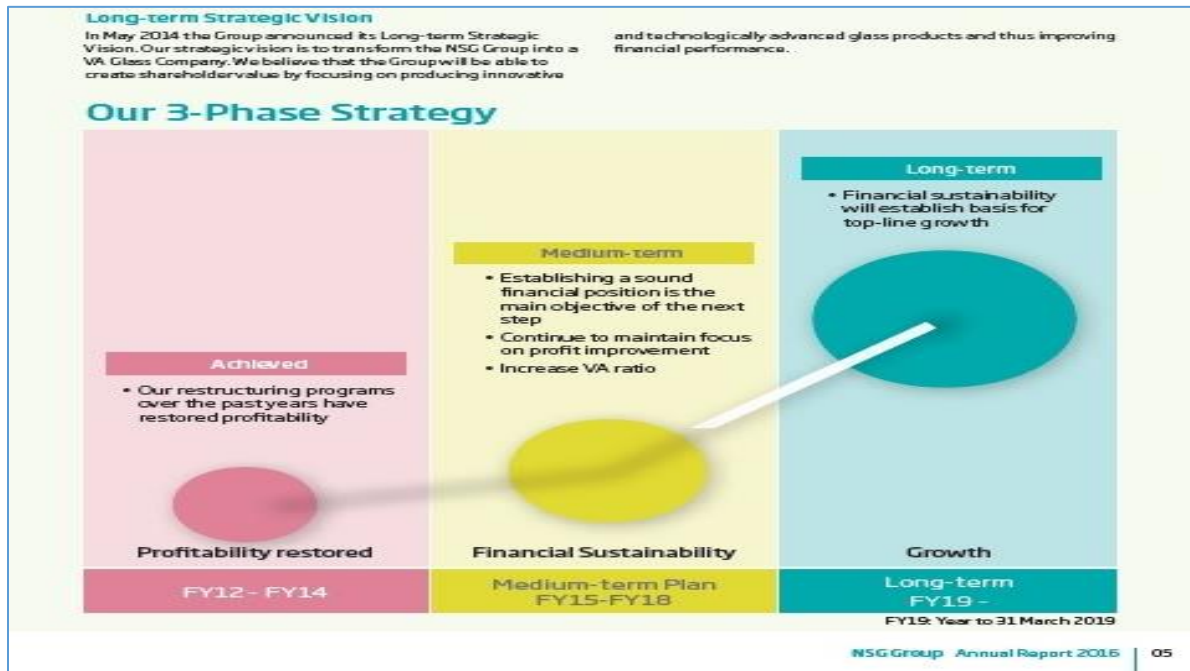


Figure 6:

## NSG 3-Phase Strategy

MSG follows the NSG Long Term Strategic Planning. For FY12-14, profitability restored, MSG is on track with the strategic planning. According to Ghazali, the real challenge is to maintain financial sustainability for medium term plan for the FY15-FY18.

With the entrance of competitors from ASEAN countries, MSG has the hard time to maintain the profit. This due to that MSG price is higher ex-factory from their competitors. MSG has to rely on the customer's loyalty in doing the business. With the current economic situation, it is a daunting task for MSG to maintain it's customer. The production of automotive in Malaysia is also another important aspect of MSG profitability. The economic slowdown has a strong impact on MSG Performance.

**Staff, Skills, and Shared Values**

The other three "Ss," in the form of MSG's staff, their skills, and shared values represent another reason for the company's success. As you will see in the following discussion, it is difficult to

separate these three factors, which seem to be tightly aligned. Ghazali's current team of 1200 full-time employees is diverse, but each possesses a strong base of job related experience and functional knowledge, and all have a genuine passion for automotive glass production. Given the difficult competitive environment and the push for community involvement, MSG's success also rests on its sales and marketing employees.

A particular strength is the way the staff collaborates to fulfill their responsibilities and create a successful operation. The shared value, or superordinate goal, at MSG making staff simple moments worthwhile is fostered by a singular belief that people are the most important asset to the company's success. As such, all employees are involved in the day-to-day decisions that affect MSG's operations, as well as bigger-picture issues such as product development and promotional campaigns.

According to Ghazali, the staff is well trained. They are sent to the relevant training locally and abroad. It is only the attitude and the culture that has the affect on production. For example if a staff is sent for training but if he or she fail to apply the training knowledge to the fullest extend, it still has negative impact on production.

As a whole, MSG's brand-focused growth strategy and people-first approach to operational management appear to be the primary drivers of MSG's success and keys to achieving the company's longer-term goals. In addition, each of these factors are clearly connected and aligned, which is consistent with the central premise of the 7-S model. However, while MSG's strategy, staff, skills, and shared values represent the most important priorities for coping with the firm's competitive environment, the remaining three 7-S factors provide another tier of support for MSG's continued success.

### *Style, Systems, and Structure*

Style is the manifestation of MSG's shared values that are supported by the intensely interactive work setting described above. In addition, Ghazali's open and engaging leadership is instrumental in promoting consensus about MSG's mission and has created a culture of continuous learning and improvement.

For example, as the manufacturing staff learn more about their craft, they share what they have learned with the sales and marketing staff, which enables that group to work more effectively with the distributors and retailers and to learn about customers' evolving needs and demands. The sales and marketing staff then relay the feedback they receive from the distributors and retailers so that the manufacturing staff can further develop MSG's products. This ongoing exchange of information provides MSG with critical business intelligence and helps the staff adapt to the competitive dynamics in a timely manner.

Most of the systems that MSG has implemented to support its overarching strategy and help maintain an efficient, coordinated work setting are fairly informal. For example, MSG has adopted a “culture-first” approach to their staffing procedures. The process is not based on structured interviewing procedures or tests to make hiring decisions. Instead, Ghazali puts a premium on spending substantial time with individuals to determine whether they possess an authentic passion for sincere interest in working for a multinational company. Ghazali explains in term of international certification, MSG has international certification for systems and product quality (refer to figure 7).



Figure 7:

#### Sungai Buloh Plant Certifications

MSG has two system certifications namely SGS and TUV. For product quality certification, MSG has 6 certification namely SIRIM, JIS, E6, ANSI, CCC, SNI and TIS. For system MSG is internationally recognized.

The bottleneck of production is system and technology used is not up to date as to current production scenario. The current practice of MSG is as the same before the entrant of new competitors in 2015. This has the impact on the efficiency and utilization to the maximum of resources in MSG. This lead the high price which not a major issue before 2015. Referring to Figure 8, the main important production process still rely on the human skills. As mentioned by Ghazali, the staff attitude and ability to perform in accordance with their skills and training are the vital factor in the quality of the production.

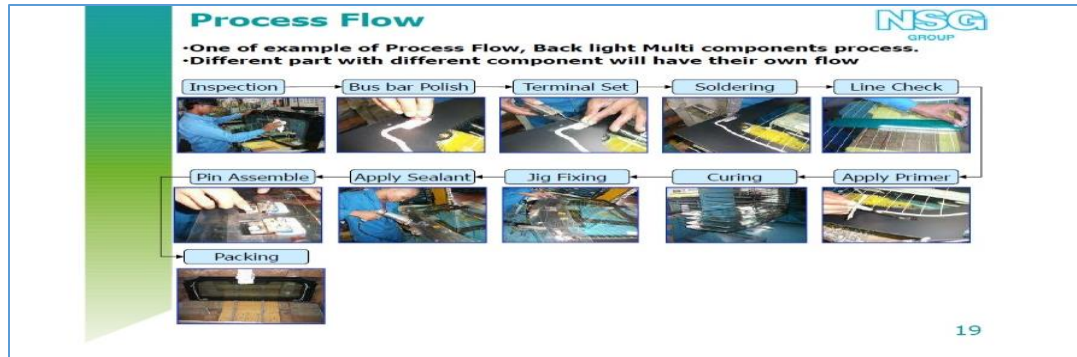


Figure 8:

### Example of Process Flow

The structure is still maintain from the year 2003 as it is still considered as efficient and can bring in more profit. With the entrance of new competitors for ASEAN, the MSG structure need to be reviewed. MSG price is slightly higher than the price being offered from its competitors'. This a worrying sign for years to come. MSG will loose customers if the current structure and method of production is maintained.

### Recommendations

Kamarulzaman and his team have come up with a few suggestions to transform the performance of MSG. The focus is to increase the efficiency and performance of MSG that can lead to the increment of market share and profit.

The main aim of MSG is increasing the profit. In other words, everything which exists in the road of having more profit is considered as a constraint. So, if MSG can handle constraints in their system and manage these constraints, it would have a continuous improvement management system thus they could achieve higher profits.

Kamarulzaman dan his team proposed steps that can be considered by MSG management as to drive better efficiency in manufacturing operations. The proposed areas are as follow:

#### *Process optimization*

Process Optimization is an act of adjusting a process to be more productive in terms of certain key parameters without violating other constraints: this effort is aimed to improve performance metrics in terms of some essential specifications (minimizing process cost, increasing efficiency, etc), while keeping all other parameters within their constraints (in other words optimization doesn't recognize any trade-offs, like increasing of a process speed at the expense of its output quality, or increasing of quality at the higher process costs). In other words a process optimization can be described as an attempt to find and eliminate all inefficiencies until a process works to its full capability (Task management guide, 2014).

Before talking about cost, MSG needs to look at its entire process. Focusing on the process rather than on the product or product-related cost might be the initial important departure from its current (usual) practice. MSG needs to get the details of the (even not-yet optimized) process characteristics. This helps to manage the whole and not a part, avoiding partial process optimization or improving a process part but (unintentional) damaging another (maybe downstream) part and sometimes making output even much worse.

Fundamentally, there are three parameters that can be adjusted to affect optimal performance. They are:

### **Equipment optimization**

The first step is to verify that the existing equipment is being used to its fullest advantage by examining operating data to identify equipment bottlenecks.

### **Operating procedures**

Operating procedures may vary widely from person-to-person or from shift-to-shift. Automation of the plant can help significantly. But automation will be of no help if the operators take control and run the plant in manual.

### **Process Control optimization**

In a manufacturing plant, such as a manufacturing plant such as MSG, there are hundreds or even thousands of control loops. Each control loop is responsible for controlling one part of the process, such as maintaining a temperature, level, or flow.

Process as used in the terms process control and process industry, refers to the methods of changing or refining raw materials to create end products. The raw materials, which either pass through or remain in a liquid, gaseous, or slurry (a mix of solids and liquids) state during the process, are transferred, measured, mixed, heated or cooled, filtered, stored, or handled in some other way to produce the end product. This is where MSG needs to optimize the process control in order to reduce variability.

Process control can reduce variability in the end product, which ensures a consistently high-quality automotive glass product. MSG can also save money by reducing variability. For example, in a glass process, as many as 10 or more different components may be blended to make a specific grade of glass. If the MSG does not have precise control over the flow of the separate components, the glass may get too much of the silica and sodium oxide components. As a result, customers would receive a lower grade and more expensive glass than they paid for, and the MSG would lose money.

### **Workforce optimization**

According to Technopedia (2017) workforce optimization is a *strategy used in business with focus on maximum customer satisfaction and benefits with minimal operational costs and supported by integrated technologies, cross-functional processes and shared objectives.*

*Workforce optimization provides and supports business by providing key data on the performance of the workforce. It is often considered as the next logical move to analyze and manage the staff and operational efficiency in order to increase the customer experience.*

By taking a demand-calibrated versus a capacity utilization approach to production decisions, MSG can better balance workforce requirements and optimize labour costs. Reduced overtime expense can be a major source of savings.

For making workforce optimization more effective, the following measures are recommended for MSG:

1. *Implementation of a scheduling solution:* By maximising workforce optimization MSG can reduce the cost of ownership and also increasing return on investment. Workforce optimization brings in integrated solutions for e-learning and analysis, which helps in streamlining performance management. This helps in increasing MSG's customer experience.
2. *Involvement of key stakeholders:* Workforce Optimization will shortens the learning curve, training expenses and reduced cost of hardware and software applications of MSG
3. *Task assignment and matching the skill should be the top most priority:* The process provides the statistics of the different quality scores and the scoreboard can provide information on various aspects of operational efficiency.
4. *For managing compliance, deployment of tools:* Workforce Optimization able to improve labour yields and increase workforce capacity which later could improve employee satisfaction.

### ***Energy consumption Efficiency***

For many manufacturers, energy represents the first or second highest (with labour being the highest) cost element. This situation is also apply to MSG By making demand-driven decisions, MSG can choose to run slower to save energy without sacrificing customer service or output. Real-time, accurate visibility into the operating conditions is critical.

Kamarulzaman suggests five no-cost or low-cost measures that will bring noticeable improvements in energy efficiency of MSG. These include things like identifying idle equipment, making simple operations and maintenance changes, or equipment retrofits, all which can deliver an immediate bottom line impact. The five recommendations are:

*6.3.1 Peak Energy Demand Identification:* Peak demand charges can often equal 30 percent of an industrial organization's monthly utility bill. Peak demand charges are typically calculated over the 15-minute interval when the organization uses the greatest amount of energy in a given billing period. Peak demand is impossible to determine simply by looking at a utility bill. But with real-time visibility of energy usage, demand peaks become obvious, including irregular peaks caused by intermittent use of high-voltage mechanical systems, improperly programmed building management systems, or other mechanical system failures. MSG is proposed to have a regularly scheduled production shifts with relatively predictable demand curves.



*6.3.2 Weekend Energy Use:* MSG has a regular production shut downs (weekends, off shift periods, scheduled maintenance windows) that should see substantial reductions in energy demands. Without visibility into shutdown levels that data and analytics make possible, it's hard to determine if optimal savings are being achieved. MSG is proposed to conduct a proper documentation on the weekend energy use.

*6.3.3 Start-Up Spikes:* Start-up spikes result when voltage jumps because multiple mechanical systems are turned on simultaneously. MSG is proposed to gradually ramping up mechanical equipment in a staged manner, excessive energy charges can be avoided without compromising production output.

*6.3.4 Compressed Air Systems:* Compressed air is used in MSG processes. Given the large electrical demands needed for air compression motors, up to 20 percent of total electrical use in certain industries can come from air compression systems. This makes these systems prime targets for energy efficiency measures.

The expense of compressed air equipment itself is often a fraction of the cost of operating and maintaining the equipment over time. MSG is proposed to do some investments to reduce operating costs will create substantial savings over the lifetime of the system. There are several low- or no-cost measures that can address the expense of running compressed air systems. Some of the most common measures (e.g., performing an air leak survey and addressing those leaks, the selective use of booster compressors) have very rapid paybacks.

### ***Lower cost of Quality***

With better access to enterprise quality intelligence, as a component of overall manufacturing intelligence, MSG can improve root cause analysis, take corrective actions more quickly, and even proactively prevent spills or quarantines from occurring in the first place.

Cost of quality is a methodology that allows an organization to determine the extent to which its resources are used for activities that prevent poor quality, that appraise the quality of the organization's products or services, and that result from internal and external failures. Having such information allows an organization to determine the potential savings to be gained by implementing process improvements.

Quality-related activities that incur costs may be divided into prevention costs, appraisal costs, and internal and external failure costs. These are quality cost that MSG is proposed to dealt with.

### **Prevention costs**

Prevention costs are incurred to prevent or avoid quality problems. These costs are associated with the design, implementation, and maintenance of the quality management system.

**Appraisal costs**

Appraisal costs are associated with measuring and monitoring activities related to quality. These costs are associated with the suppliers' and customers' evaluation of purchased materials, processes, products, and services to ensure that they conform to specifications.

**Internal failure costs**

Internal failure costs are incurred to remedy defects discovered before the product or service is delivered to the customer. These costs occur when the results of work fail to reach design quality standards and are detected before they are transferred to the customer.

**External failure costs**

External failure costs are incurred to remedy defects discovered by customers. These costs occur when products or services that fail to reach design quality standards are not detected until after transfer to the customer.

***Lower cost of regulatory compliance***

A regulatory compliance cost is expenditure of time or money in conforming to government requirements such as legislation or regulation. Regulatory compliance fo

As a continuation of improving quality and real-time visibility to how quality processes are executed and managed, it follows that the benefits not only reduce the cost of compliance, but also help to avoid production mistakes in the first place, which can cost a fortune to correct. MSG must comply with the government and relevant bodies' requirement to avoid unnecessary cost such penalty, non compliance products.

***Inventory carrying costs***

For MSG storing product inventory for a long period of time comes at a cost. Manufacturers need to consider the cost of storage, any necessary insurance, maintenance and other factors. Whenever possible, MSG will benefit from nimble and responsive manufacturing operations to avoid overproduction and the resulting excess storage costs and risk. By calibrating operating cadence to customer demand, MSG can avoid "out-of-stock" occurrences without storing excess inventory.

The areas proposed to MSG forms the solid foundation for manufacturing excellence. They also determine the dimensions and detailed scope of the imperative operational visibility.

Kamarulzaman and his team propose to MSG management, in order to perform the transformation of MSG, there are three important approach that they must used. It is important for them not to just proceed with only one approach. This phenomenom will lead the failure of whatever improvement planning for MSG. The approach that can be used are:

***Top down***

MSG leadership team need to make a concerted effort to clarify priorities, create energy, and signal commitment to change in performance and behavior through a variety of approaches: everything from new themes and visions to new measures and objectives.

MSG is proposed to begin its transformation efforts with a very broad objectives such as, "to lead the industry of automotive glass in Malaysia." Successful efforts push over time for increasing clarity and specificity in top-down direction as change pushes toward tangibility at the front line. This clarity helped align other change efforts to make it evident how they contributed to the overall goal.

***Bottom up***

MSG can apply this approach where innovation is needed, as the Bottom-Up approach is more appropriate in change management. Innovation is essentially participative and relies on a variety of ideas by involving everyone in the MSG. When such wealth of information is needed, matching the ideas from lower levels with those from leaders makes for collective decision-making. It breeds a culture of innovation within MSG, making it easier to pave the way for internal change.

By allowing everyone in the MSG to participate in the change process, there are naturally various sources of information at hand that the top-level managers can bring into one useful and innovative whole. When collective decision-making is supported, people are tasked with the responsibility of contributing anything he or she can for the betterment of the MSG, thereby carrying everyone on the crest of success.

***Core process***

The goal of CPR is to produce simultaneous, dramatic improvements (25 to 75 percent or more) in cost, quality, and time by shifting the focus of work and decision making from hierarchical channels to new horizontal flows across functions, locations, and organizational boundaries.

MSG is advised that it a few (three to five) core processes that deliver the majority of an enterprise's value to its customers. In automotive glass industry, for example, one core process might be product development, which links functional activities in R&D, manufacturing, marketing, and distribution to provide customers with a steady stream of innovative products.

**Conclusion**

To be truly effective, however, these approaches must be tailored to the specific challenges, skills, and change readiness of a given part of the organization. This requires, among other things, designing a methodology for setting appropriate goals and performance objectives, developing analytical templates to guide problem solving, and determining specific information needs that, of course, will vary by level and unit. For most parts of MSG, this effort will start simply and become more advanced over time.

The net effect of launching such team-based problem-solving efforts is much like getting a flywheel spinning. Initially, tremendous inertia exists, and the first cycle can be lengthy and difficult, requiring substantial energy from outside the group to get it started. But if the process continues to be supported and rewarded by management, momentum gradually builds, improvements are achieved, the problem-solving cycle runs a more regular course, and the promise of "continuous improvement" becomes a real possibility.

MSG manufacturing output has remained relatively stable, whereas manufacturing profitability has been declining. There are several explanations for the relatively low level of MSG manufacturing profitability, including the emergence of new competitors, the high cost of labour and the level of competency of staff. MSG needs to move up the value chain and compete on the basis of value delivered rather than on the basis of cost.

MSG has to compete on the basis of value delivered by shifting its market share from manufacturing to more product-service oriented systems. The adoption of a new product-service strategy requires investments on capacity building such as the acquisition of new peoples' skills, capabilities and technologies, etc. MSG is likely to change its strategies, operations and value chains, technologies, people expertise and system integration capabilities.

All the recommendations and suggestion for MSG is a starting point for the company to push deeper into Industrial 4.0 concept. Industry 4.0, or the Fourth Industrial Revolution, is set to revolutionize the manufacturing and production industry by integrating the Internet of Things (IoT), cloud computing, data integration and other technological advances into the heart of production and manufacturing systems. Industry 4.0 is the next revolution in industrialization.

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