

NEW PRODUCT DEVELOPMENT FAILURE IN OSM MALAYSIA

Saravanan Raman ^a, Kumareson Darmalingam ^b, Subhaseni Chinniah ^c

^a KDU Penang University College, Georgetown, Penang, Malaysia

^b OSM Malaysia, Bayan Lepas, Penang, Malaysia

^c Ministry of Education, Malaysia

Corresponding email: saravanan.r@kdupg.edu.my

Abstract

The study attempts to investigate the cause of the new product development failure at OSM Malaysia (OSMM). The research identified five prominent variables which cause new product development failure. The Five factors are management style, technical expertise / knowledge, job stress level, project management skill and cross functional team support. This research use both primary and secondary data information to analyze the data findings. A self-administrated questionnaire with 32 questions was given to the respondents. The questionnaire used Likert scale range between 1 to 5 to determine the level or agreement of the respondent to the items listed. Management Style is the most influencing factor that causes the new product development failure in OSMM. While the technical expertise/knowledge shows a positive relationship, it is not statistically significant; hence this independent variable should not be neglected as well. Anyhow the research has also ruled out the job stress level, project management skills and cross functional team support towards the new product development failure as it has a negative direction and the strength of relationship is relatively weak. OSMM new product development failure can be improved if the management team pays attention to the management style which needs to be fine tune to meet current globalization market trends and needs. There are limited journals or researches that are published which have direct relevance to the new product failures in OSMM, other than that experienced delay in receiving the respondents reply to the questionnaire as it was done during working hours and most of employees' feedback for the delay was due to their workload.

Keywords: New Product Development, Failure, Management Style, Technical Expertise, Job Stress Level, Project Management Skills and Cross Functional Team Support.

1. Introduction

1.1 Background of Studies

The OSMM (Not actual name) is the business nature known as "OSAT" (Outsource Semiconductor Assembly and Test) where OSMM provide services from designing of the lead frame/substrate for IC packaging, Assembly process development, Final Test Customized Test program development, reliability assessments, product characterization and finally packing and shipping to customers or end customers. OSMM has been established in Penang, Malaysia since 1991 and now it has reached 25 years in the industry with a total of 3000 employees supporting more than 30 customers. The product ranges from standard Integrated Packages, RF Product, Image Sensor and Solar Modules. The OSMM faces tremendous challenges with this new product development failure which has triggered the entire management to identify the issues

behind this. OSMM received orders from client's integrated circuit (IC) design and the OSMM manufacturers the IC's according to the specification provided by the client. Once the manufacturing process is complete, the staff from test unit will conduct the reliability assessment to make sure the IC's are produced according to the specification given to them. This is one of the common processes executed before handing over the IC's to the customers.

According to Tanawat et al (2015), new product development is a process of transforming initial ideas into a robust concept to meet the clients' requirements. The researchers also added that failure in following the new product development process will lead to the unnecessary deliberation between pre-development and implementation phase. The literature also indicates that it will lead to unnecessary costs and high lead time. In another research by Pitta and Pitta (2012), it was found that the new product developers face high failures rates in introduction phase. The failure rate is as high as 95%. This shows the risk and cost of new product development needs to be liable by the organization. Besides that, the researcher estimates the cost of new product development failure has triggered to \$20 billion a year. This was supported by Jeffrey (2012) saying that new product development failure rate for new products has not been reduced significantly. Additionally, the researcher said that many new product development failures are because of omitting technical activities and marketing activities in the manufacturing process. The researcher also added that new product development failures are highly dominated by technical activities and marketing receives very little attention. Many researchers have explored the causes behind the new product development failure to minimize the cost as well as risk. In fact, when Coca-Cola introduced diet Coke with artificial sweetener failed in the market after introducing in the market within few days. This has given a chance for the competitors to take bigger segments of coca cola as their customer. In fact, many researchers have been called to focus on early process involved in the new product development. This was observed by Dwyer and Mellor (1991) in their research which found that upfront processes have very strong impact on new product development failures. Interestingly, the research also found the importance of appropriate allocations of resources which will reduce new product development failures.

1.2 Research Problem

According to Luca (2011), the term "failure" is defined as an event of manifest termination of expected performance. Additionally, the author also stated that the definition of failure of new product suitable for the life cycle of the product in the market. It is essential in achieving high satisfaction and long term relationships in delivering products that meet the clients' requirements (Goffin and New 2001). Additionally, the researchers also addressed the importance of managers in determining the success of the products which contributes directly to the revenue of the organization. Many marketing and operations scholars describing new product development failure are increasing and asked to pay attention. According to Shulver (2005), failure is defined as an operational inability to deploy appropriate activities to earn a return. The author also added that the failure may generate various negative consequences such as customer defection, damaged corporate reputation, litigation and increase insurance costs. In the same article, the author also highlighted that Business Process reengineering looking into failure assessment as one of the key areas to provide a better framework from managers to prevent failures in the beginning stage. In OSMM context, the new product development success rate in year 2010 was 95% and in recent years, it is at downtrend and the number of new customers engaging with OSM has been reduced. Taking the year 2015, OSMM new product development launch success rate was around 75%, which has caused Q1'16 forecasts volume affected which also directly affected the overall revenue of the company. This has triggered the OSM to retain the new product success in the market. The recent studies in the new product success show that there are many factors that actually contribute to the product failure. Furthermore, the biggest challenge for OSM is to retain the success rate of the previous year in

securing further business from clients. Identification of the main factors contributing to the product failure becomes an essential point for them. The disconfirmation theory (Lankton and McKnight,2012) explaining the level of satisfaction among the customers which was discussed widely in the service sector also can be used in the product context. The theory explains the prior expectation from the customer on the how the product needs to perform. On another note, another theory known as equity theory by Pritchard (1969) explains the mechanism between the customer and another party need to be equal. In case the return on investment is unequal and then this will cause a negative impact on the relationship. The perceived quality will create tension and stress to the customers and eventually they will leave. The marketing literature on equity theory focuses on product dissatisfaction among the customers when perceived inequity. Furthermore, the customer evaluates by comparing the outcome of the product to them and striving towards achieving equity. According to Cooper and Kleinschmidt (2007) the new product success will lead to the direct impact to the business. These phenomena are worrying the OSMM who is trying to reduce the failure rate which also causing business lost for them. Furthermore, OSMM has set a new target to achieve 95% new product success rate by 2017. Hence, the preliminary research will help to examine the variables which lead to the new product development failure at the OSMM. Furthermore, quick response from the management is required to identify the factors and to fix them in short period of time to keep the competitive advantage in the market. The cause of failure helps us to prevent the future incidence and improve the overall performance of the device, component or staff. From the clients' viewpoint, failure in the beginning stage is unacceptable. In other words, the dead-on arrival will undermine the clients' confidence of the organization and future projects with them. The manufacturer must eliminate the defect and always take initiative to improve the product robustness. This will help to reduce product failures at the infant stage. According to Maarten Van Craen (2016), the fairness theory explains the standing of the customer in encountering negative events such as product failure which leads to the counterfactual thinking. Therefore, the customer will be going beyond the fact to highlight the new product development failure situation. This theory is well aligned with OSMM where the new product development failure also engaged OSMM with the product in lower profit margin and small volume of forecasted product. This has given an impact to OSMM in terms of the company total revenue. In the year 2016,OSMM experienced 15% reduction of revenue. Besides that, another theory known as group value theory by Souca and Vala (2002) explains the indication of the customer on their standing with existing manufacturer and will be part of the group if they add value for them. The author also added that, after demonstrating relevant interaction between customer and client, this will establish a psychological understanding between two parties. Besides that, Southey (2016), identified other several failure points which lead to the product failure such as insubordination of employees in taking responsibility and lack of employees' response also observed as another problem in new product development failure. OSMM has experienced such related issues during the prototype to the final qualification building the Process Yield was lower than the target but due to lack of the knowledge and lower sensitivity, the yield loss was characterized as the incoming material issue. During the new product release the lower yield issue was brought up to the management and customer's attention which lead to a detailed investigation by OSMM and found that the root cause was due to OSM process and not the incoming material which was consigned by the customer. This has tarnished OSMM's technical capabilities and caused a requalification which eventually pushes out the launch of the new product in 4 months and OSM has lost the status of tier 1 supplier status. This has caused loss in terms of profitability and also opportunity for new product development by the customer.

2.0 Previous Studies

2.1 Management Style

According to (Wellens, 1980) management styles are associated with McGregor and his Theory X and Y which was introduced in the year 1960. He has taken a different approach view of the management style from Americans and Japanese. In the year 1960, the Japanese style gets attention from many industries which was seen as one of the successful approaches for management to achieve high productivity. This formula identified as a 'J' formula among social scientist who believes that, this new approach will be the new management style to manage the employees. In another research, it is found that the management style has a high impact on the performance of the organization. According to Swaim (2010), the best management style model is to achieve the result and secondly the relationship. The management style is explained by Schmidt- Tannenbaum continuum in 1958 which suggest that four types of leadership style such as autocratic, paternalistic, consultative and demographic which will shape the behavior of the managers and influence the employees. This will also determine the level of tolerance between employees and managers in executing the plan. However, the research also stressed that the behaviour of both parties is basically to maintain a relationship to achieve organizational goal. (Everard, et al., 2004). Besides that, according to John (2007), another reason for new product development failure is because of poor management through poor leadership. This can be observed in the organizational culture and management expectation through the managers. In many cases, the managers failed to provide adequate information to the subordinates has caused new product development failure. Furthermore, the demanding environment is also seen as one of the important factures leading the new product development failure in the organization

2.2 Technical Expertise

According to Sondergaard, et al., (2007, there has been increasing interest in the topic of knowledge and most recent research identified the importance of knowledge in the organization. Furthermore, the researcher emphasizes the importance of having technical experts in the organization to provide expert advice, when it is required. The ability of the employee to response to the problems will help the organization to minimize the risk associated with this. According to Forrier (2003), Knowledge /Technical Expertise is one key activity that is undeniably one of the most knowledge-intensive processes and is by itself constantly creating new knowledge which is key in the New Product Development. These new knowledge are considered to be useful ideas in enhancing the development of new products and processes to manufacture products and services for the organization. The successful management of this knowledge becomes a distinguishing factor in the competitive advantage possessed by market leaders, particularly in acknowledge-intensive industries like the semiconductor industries (Appleyard & Kalsow, 1999). However, the researcher also added that, the managers are also unwilling to cooperate to provide technical knowledge and expertise because of time factors. Besides that, the knowledge elicitation often cited as the "bottleneck" which stuck in the middle before flowing to another stakeholder. This has caused delays which lead to the product failure in the organization. The literature identified the major challenges faced by organization due to lack of suitable knowledge to help the operation department to prevent new product development failures.

2.3 Job Stress Level

According to Mitani, (2015) job stress is referred to as a harmful physical response which occurs when the job requirement does not match with the capabilities and resources or needs of the workforce. The job stress will lead to poor health and physical injuries. According to American Institutes of Stress (AIS, 2016) job stress is defined as a perception of having little control, but lot of demand phenomena which increases disorders among the employees in the organization. Besides that, The National Institutes of Occupational Safety and Health (NIOSH) (NIOSH),

2016) defines stress as a situation where job demand cannot be met which has turned into feelings of stress. This is due to the poor interaction between workers and job conditions which cause job stress among employees. Many literatures have highlighted that stress has caused emotional disorder among the employees and disabilities. Eventually, employees suffered psychological breakdown. The National Institute of Occupational Safety and Health (NIOSH) identified the main reasons for the job stress among the employees and the management style observed as one of the important factors that causes high job stress among employees. The poor participation of employees in the decision making, poor communication and unfriendly policy are observed as one of the main factors contributing high stress levels among the staff. Besides that, Zakkariya (2015) explains that job stress is a characteristic of work conditions or happenings which resulted in a dysfunctional reaction among the employees. Additionally, the author also stated that, many researches have been conducted to identify the causes and effects of job stress in the workplace. The researchers also highlighted that job stress alone has cost USD 20 Billion annually for American business, Pound 63 Billion and Australia \$15 Billion due to the compensation, absenteeism, direct medical expenses and illness. Supporting this statement, (Grissom, et al., 2015) mentioned that job stress occurs when the management placed high demands on individuals which exceeds the available resources. The epidemic of workplace stress encountered among employee has caused high turnover among employees. This becomes another disaster for the organization to overcome it. The high level of stress also reduces total productivity and increases failures in the operational activities. The researcher also highlighted that the stress among employees, especially work overload, role conflict, role ambiguity results in job burnout. Job Stress in the NPD department is given in creating new idea, crisis faced by the team and the anxiety creates the highest level of stress (Akgun et al, 2006;2007). Many researches have been conducted on the job stress, but not specifically on new product development failure nevertheless this research talks about the employee behavior change due to the stress level which directly influences the performance of an individual where it gives a greater effect on the new product development success in a company when these are directly involved. In both developed and developing countries, one of the most significant health risks which employees are exposed to is job stress (Paul, 2002,) Danna and Griffin, (2002), Paul (2009) further posits that there are number of factors that are known as job stressors. These job stressors can make the assigned task difficult and stressful for employees no matter of them working in service or manufacturing industries.

2.4 Project Management Skills

According to Czuchry & Yasi (2003), the rapid growth of global business makes the project managers understand variables, tools and skills in order to integrate them together and manage them effectively. However, in reality it is not easy. The author highlighted that several key areas need to be considered in the project management such as schedule, cost and quality control which determine the success of a project. However, the author also stated that previously many organization using traditional way known as close system to manage the project. However, the rapid growth of information technology has open up a lot of space for the project managers to practice open communication with the team to prevent failure. Besides that, (Roper & Phillips, 2007) stated that the current business environment is not what it used to be. The project management team expected to complete the task under time pressure. Furthermore, the project managers are required to be multi-talented; handling multiple tasks at one time and must hold natural leadership style to handle various problems in the project. The author added that, the meaning responsibility creates a meaningful outcome and momentum for a specific problem in developing the new product. The project management is a good mechanism allowing the team members to organize, plan, regulate and control the entire project management using democratic way. However, in some circumstances the project management team will face conflict particularly in the situation such daunting task of striking and to get job done within the

limited time. This leads to the high pressure among the employees making them feeling uncomfortable and leave the organization. Besides that, the author also highlighted the ideal size of project management team is between 10-20. This will help them to share the ideas in the small group. However, the author also did not deny that, some multinational corporation used to have 50 members in the project management team to handle big project which involves various countries (Roper & Phillips, 2007). Furthermore, (Sondergaard, et al., 2007) mentioned that these practices become part of the organization should encourage the engineers to involve in the new product development and incorporate their knowledge into the project management. Furthermore, the researcher also referred to Prust (2001) in his research stating the importance of developing a close relationship between team members in the team to achieve the project objectives. (Handzic, 2011). Generally, the project management success highly depends on 8 important factors which determine the success or failure of a project. The eight important factors are economic performance, flexible knowledge, and knowledge friendly, clear purpose, motivational practices, knowledge transfer and management support. Besides that, the researcher also addressed the importance of information technology in determining the success or failure of a project management team. The highly integrated team will facilitate knowledge among the project management team to work together and promotes contingency views or multiple possible paths in case of uncertain circumstances.

2. 5 Cross Functional Team Support

According to (Boyle, et al., 2005), cross-functional team support as of achieving firm's integration. Generally, a new product development team includes internal and external members from various departments such as engineering, design, purchasing, marketing, production, and suppliers. The involvement of members from various departments helps them to achieve better decision making, particularly in conflicting matters. There are many researches on evidence of the effective new product development team and how they succeed. Cross Functional Team support is very crucial for the New product development, this has been discussed and justified by many researchers, (Kumar V, Fantasy, Kumaru & Boyle 2006) talked about cross functional team benefits including significant reduction in new product development cycle time which directly give advantages for new product development /launch and vice versa when the cross functional support is poor during the new product development stages. Besides that, (Boyle, et al., 2005) stated that, there are many studies which have explored the role of management in rendering support highlighted as one of the important determinants to decide on success or failure of the new product. The senior management should assign responsibilities effectively and this enables them to work with clear direction towards achieving the common goal of the project. Furthermore, many researches have stated that the management style has a positive effect on new product development success and failure. However, in another research, the author stated that, the managers must give up some degree of power to the cross-functional team to carry out their duties effectively. Besides that, Roger Chin (2015) stated that, the cross-functional team support also need to be rewarded in order to keep their spirit and excitement to bring the product as per customers' requirement. On other hands, the cross-functional team consists of members from the various fields can cause communication barriers and conflict among them. The variables identified are extensively debated by the researchers in the marketing and manufacturing. Hence, the research will use an independent variable discussed above with new product development failure as a dependent variable. The new product development failure can be prevented if the organization has appropriate support from top management to execute the right plan. Secondly, the new product development team must have a dedicated team who are willing to work together to achieve the common goal of the organization. Besides that, the managers must provide adequate information to the support team to focus on process. Adding to the point, the cross functional teams must actively communicate to improve the interaction among various departments members.

3. 0 Research Approach

The research is based on data that were collected to identify the cause of NPD failure at OSM. The research intends to identify the variable that causes new product development failure at OSMM. Initially, the research study review existing literature and found five prominent variables that caused new product development failure in the industry. The five variables are management style, technical expertise/knowledge, job stress level, project management skill and cross functional team support. The five variables tested using quantitative method addressing the relationship between dependent variable. Besides that, the research used positivism as research philosophical paradigm which will provide empirical evidence to support the research questions and hypothesis. A questionnaire designed to collect data from the respondents. The questionnaire uses Likert scale values from 1 to 5. The value 1 is strongly disagree, value 2 means disagree, value 3 neutral, value 4 Agree and value 5 means Strongly agree. This will help the researcher to rank the high impact factor that lead to the new product development failure in the OSM. Furthermore, the quantitative research will be able to collect data from large samples and can be used to generalized the findings and achieve the objectives.

3.2 Sampling Size

According to (Boddy, 2016), the sample size question in the quantitative approach frequently asked by the researcher is to determine number of samples need to be considered for the research. Korvin & Shipley, 2001 stated that, deciding sample size is essential to determine the quality of the research and reasonable sample size is required to justify the findings. For this, the sample consists of Technician Engineer, Executive and Manager who are directly involved on the New Product Development activity at OSMM. The registered population is 160 as per July 2016, hence the sample size for this will be (n=100) Based on the Bartlett, Kotrlik and Higgins table (Based on 5% significant level). The random sampling method used to identify the participant for the research. The random sampling method is identified as the target populations are homogeneous and the sampling method has high probability to eliminate systematic bias by giving all individuals an equal chance to be chosen from the population. There are 160 staff working in the new product development department and questionnaires were distributed among the staff to identify the variables cause new product development failure at OSMM

4. 0 Data Analysis

4.1 Descriptive

The analysis pointed out that all the respondents have answered the question of the position which indicated on table 4.1 above where the n =100 and the missing =0. Another item to be taken note that the respondents from all 4 levels of position listed in the questionnaire has participated. Based on the data distribution the senior manager/manager is 10% of the total respondents population, staff engineer/section head is 11%, while executive/senior engineer/engineer is 50% of the respondents population and finally the technical specialist/junior executive/technician which is 29% of the total respondents population. The mode in Table 4.1.1 indicates mode =3 which means that the most of the respondents are in position rank 3 of which are executive/ senior engineer/engineer.

Table 4.1.1: Demographic characteristics of respondents

Demographic	Category	Frequencies (n)
Position	Snr Manager/Manager	10
	Staff Engineer/Section Head	11
	Executive/Senior Engineer/Engineer	50
	Technical Specialist/Junior Executive/ Technician	29
Length of service	Below 2 years	2
	2-3 years	57
	3-5 years	26
	5-6 years	5
	7-8 years	2
	9-10- years	1
	10 years above	7

Note : n=100

For the length of service it is noticed that all the 100 respondents participated on the survey and answered the question where the n=100 and missing =0. Anyhow the table 4.1 the category of the length of service (years) below 1 year does not appear thus, indicates that none of the 100 respondents who participated in the survey have length of service below 1 year. The mode is 2 which mean the most of the populations' length of services are 2 to 3 years which is 57 % and the length of services of 3 to 5 years is 26%, while length of service for 5 to 6 year are 6 5%. Length of service of 7 to 8 years are 2%, length of service of 9 to 10 years is 1 %. Finally, the length of service of 10 years and above is at 85 of the total respondent population. Referring to Figure 4.2, the graph show the distribution of the length of the service (years) is skewed to the lower side of length of service among the respondent which also indicates the organization is young. The standard deviation value is 1.444 and range of 5 years calculated by taking (maximum – minimum) length of service. Indirectly point and higher variation or also can consider as wide spread of employees/respondents.

4.2 Reliability Test

Reliability of the survey was measured through Cronbach's alpha and shows higher internal consistency among the scales. In this study, Cronbach's Alpha test adapted from Zikmund et al., (2010) has been chosen to examine the internal consistency reliability of the measurement scale. However, reliability of the individual scales was different from range of 0.74 to 0.87 (Table 4.2.1).

Table 4.2.1 Reliability Analysis.

Variables	Cronbach' Alpha
Management Style	0.86
Technical Expertise/ Knowledge	0.74
Job Stress	0.76
Project Management Skills	0.75
Functional Team Support	0.74
New Product Development Failure	0.87

The p value is the key output response for the judgment whereby probability (P- value >0.05) shows significant association for the hypothesis testing. Inferential analysis accuracy depends on the Cronbach's alpha where it requires >0.7, Cronbach's alpha analysis is carried out to check the reliability or consistency of the internal data which is very important for the research analysis. The dependent variable Cronbach's alpha value is 0.87 which shows a highly reliable or consistent. After confirming the survey items reliability, researchers calculated correlations among the variables used for the study. By using Pearson's correlations analysis, a significant correlations between the scale were determined at two levels, i.e. p=0.005 and p=0.01 (Table 4.2.1)

Table 4.2.2 Pearson's Correlations

Variable	1	2	3	4	5	6
1 NPD Failure	-					
2 Management Style	- 0.277**	-				
3 Technical expertise/knowledge	-0.57	0.540**	-			
4 Job stress level	-0.029	0.619**	0.451**	-		
5 project Management skill	-0.009	0.421**	0.383**	0.440**	-	
6 Cross Functional team support	0.021	0.625**	0.542**	0.675**	0.389**	-

Notes: n=100. ** Correlation is significant at the 0.01 level (2-tailed)

Based on the above table 4.2.2, all the hypothesis developed in the theoretical framework will be tested for its significant, strength and direction of the relationship. The correlation is significant at a probability alpha value of 0.01 two tailed analysis.

Hypothesis 1

Ho: There is no significant association between management style and new product development failure.

Referring to the table 4.2.2 above using Pearson correlation direction of the relationship is negative between the management style (MS) and the new product development failure because the management style has the correlation coefficient value of -0.277. Therefore, it is concluded that when the management style is high, the new product development failure will be low or vice versa. The negative direction of relationship will have the independent variable and dependent variable will always move in opposite direction. Correlation coefficient is -0.577 which mean it is not in between \pm (0.71 to 0.91), hence it is concluded that strength of the relationship between management style and new product development failure is moderate. The p-value is 0.00 which is lower than the alpha value 0.01 hence there is a significant association between management style and new product development. Therefore, we reject the null hypothesis HO and accept H1.

Hypothesis 2

Ho: There is no significant association between technical expertise/knowledge and new product development failure.

Based on the correlation coefficient value of 0.057 as stated in table 4.2.2 is show that the direction of the relationship is positive relationship between the technical expertise/knowledge and new product development failure. Which means when the technical expertise / knowledge

and new product development is moving to positive direction simultaneously in other word when the lack of technical expertise/knowledge is high the new product development failure is high or vice versa. Positive direction of relationship will have the independent variable and dependent variable move in same direction towards positive axis. Based on table 4.4, the coefficient is 0.574 which is not in the range of \pm (0.71 to 0.91), therefore the strength of the relationship between technical expertise/knowledge and new product development failure can be considered as moderate relationship. The p-value is 0.504 which is higher than the alpha value 0.01. Hence, there is no significant association between lack of technical expertise/knowledge and new product development failure. This has resulted to accept the null hypothesis H_0 and reject the H_1 .

Hypothesis 3

H_0 : There is no significant association between job stress level and new product development failure.

Referring to table 4.2.2 the correlation coefficient value (r) is -0.029 indicates that the direction of the relationship is negative relationship between the job stress level and new product development failure. This indicates when job stress level is high the new product development failure is low or vice versa. Negative direction of relationship will have the independent variable and dependent variable will always move in opposite direction. Based on the table 4.4 the coefficient is -0.029 which is out of the range of \pm (0.71 to 0.91) for strong correlation, therefore the strength of the relationship for the job stress level towards the new product development failure is concluded as weak. The p-value is 0.778 which is higher than the alpha value 0.01. Hence, there is no significant association between job stress level and new product development failure has resulted to accept the null hypothesis H_0 and reject the H_1 .

Hypothesis 4

H_0 : There is no significant association between project management skill and new product development failure.

Referring to table 4.2.2 the correlation coefficient value (r) is -0.009 indicates that the direction of the relationship is negative relationship between the project management skill and new product development failure. This indicates that when project management skill is high, the new product development failure is low. Negative direction of relationship will have the independent variable and dependent variable will always move in opposite direction. Based on the table 4.4 the coefficient is -0.009 which is out of the range of \pm (0.71 to 0.91) for strong correlation, therefore the strength of the relationship for the project management skill towards the new product development failure is concluded as weak or almost no strength of relationship in contact of social science research. The p-value is 0.924 which is higher than the alpha value 0.01. Hence, there is no significant association between project management skill and new product development failure has resulted to accept the null hypothesis H_0 and reject the H_1 .

Hypothesis 5

H_0 : There is no significant association between cross functional team support and new product development failure

Referring to table 4.2.2 the correlation coefficient value (r) is -0.009 which indicates that the direction of the relationship is negative relationship between the cross functional team support and new product development failure. This indicates when project management skill is high the new product development failure is low. Negative direction of relationship will have the

independent variable and dependent variable will always move in opposite direction. Strength of the relationship between cross-functional team support and new product development failure. Based on the table 4.4 the coefficient is -0.009 which is out of the range of \pm (0.71 to 0.91) for strong correlation, therefore the strength of the relationship for the cross functional team support towards the new product development failure is concluded as weak or almost no strength of relationship in contact of social science research. The p-value is 0.924 which is higher than the alpha value 0.01. Hence there is no significant association between cross functional team support and new product development failure has resulted to accept the null hypothesis H_0 and reject the H_1 .

Hypothesis 6

H_0 : The five independent variables (management style, technical expertise/knowledge, job stress, project management skill, cross functional team support are not significantly explaining the variance in the new product development failure.

Based on the table 4.2.2 above the (R) correlation coefficient value is 0.420 which is 42% whereby the independent variable which is management style, technical expertise/knowledge, job stress, project management skill, cross functional team support when they are analyzed with multiple linear regression it indicates that it is a positive relationship and it can be considered as moderate correlation between the five independent variable (management style, technical expertise/ knowledge, job stress, project management skill, cross functional team support and the dependent variable (new product development failure).

Table : 4.2.3 Model Summary

Model	R	R Square	Adjusted R Square	Std error of the estimate
1	.420 ^a	0.176	0.132	0.642

a. Predictors: (Constant), MS, PM, TE, JS & CFT

The above table 4.2.3 shows the R square 0.176 or 17.60% of the five independent variables. The R square value 17.6% indicates how much of the variance in the dependent variable (new product development failure) is explained by multiple linear regression models. The R^2 value of 17.6% indicates that the five independent variables (management style, technical expertise/knowledge, job stress level, project management skill and cross functional team support are included to produce the result of 17.6% of the R^2 value. The above table 4.2.3 also shows the adjusted R^2 of 0.132 = 13.20% which is slightly lower; this is due the adjusted R^2 value Based on the analysis of the dominant independent variable which affects the dependent variable. Hence the value normally will be lower compared to R square. The standard error of estimate is 0.642 which mean the standard deviation is big within the five independent variables toward the dependent variable where using the multiple linear it checks for the distance /difference between actual value and the estimated value.

Table 4.2.4 Anova

Model	Sum of Squares	Df	Mean square	F	Sig
Regression	8.297	5	1.659	4.022	0.22**
Residual	38.783	94	0.413		
Total	47.08	99			

Notes: **Significant at the $p < 0.001$

ANOVA analysis is the one-way variance analysis which used to identify whether there is any significant differences between the mean of the three or more independent variable and in this case management, style(MS), technical expertise/knowledge(TE), job stress(JS), project management skill (PM) and cross functional team support (CFT). In the table 4.2.4, it is mentioned as regression and residual, Regression mean explained deviation and residual means unexplained deviation. Sum of squares is a measurement where it measures the variation of a deviation to its mean value. The df or known as degree of freedom which mean number of independent variable in a model as per (Toothaker & Miller,1996; walker 1940; Yu ,1997). In this research, we have five independent variables which is shown under the column of the degree of freedom (df) for the regression model. The F-ratio is calculated to measure the variation of the mean between the independent variables. According to Field, (2013) the F ratio indicates the improvement of the prediction which obtained from the fitting model due to the inaccuracy that exist in the model. For this research study, the F ration value is at 4.222 and the ANOVA analysis signification (sig) at p=0.002 which indicates that the regression model was not significant and there is high variation between all the 5 independent variables hence there are not significant The next item to analysis and understand the overall behavior of the independent variables towards the dependent variable the Coefficients table as shown below in Table 4.2.4

Table 4.2.5 Multiple Regression Analysis

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std Errors	Beta	T	p-value
(Constant)	3.386	0.634		5.338	0.000
Management Style	-0.605	0.138	-0.587	-4.381	0.000
Technical Expertise/ Knowledge	0.262	0.147	0.211	1.782	0.078
Job Stress	0.092	0.146	0.0887	0.632	0.529*
Project Management Skills	0.064	0.166	0.042	0.386	0.701
Cross Functional Team Support	0.262	0.186	0.199	1.41	0.162

Notes: * Statically significant at the 10% level; ** Statically significant at the 5% level; ***Statistically significant at the 1% level.

The coefficients table help to interpret the direction of the relationship of the independent variable and dependent variable and the indicator of the positive or negative Based on the (plus to minus sign) for this research the beta value is 3.386 which mean the direction of the relationship is positive. Based on the result on the table 4.5.2 an equation for the regression model has been derived as below which represent the independent variables (management style(MS), technical expertise/knowledge (TE), job stress level (JS), project management skill(PM)and cross functional team support(CFT) are the factor that can caused the new product development failure in OSMM. The equation derived Based on the independent and dependent variable with respect the table 4.5.2 above will be ass below.

Equation

$$Y = a + 1X_1 + 2X_2 + 3X_3 + 4X_4 + 5X_5$$

$$Y = 3.386(\text{Constant}) - 0.605(\text{MS}) + 0.262(\text{TE}) + 0.092(\text{JS}) + 0.064(\text{PM}) + 0.262(\text{CFT})$$

Where: -

Y = New Product Development Failure (NDFT)

a = Constant

X1 = Management Style (MS)

X2 = Technical Expertise /Knowledge (TE)

X3 = Job Stress Level (JS)

X4 = Project Management Skill (PM)
X5 = Cross Functional Team Support (CFT)

The result indicates that only 1 predictor has contributed to the new product failure in OSMM which is the management style. Management style is the most significant independent variable Based on the t - value which is -4.381 and with the p value of 0.000 which is smaller than the alpha value of 0.01, this indicate very strongly that the management style it the most significant root cause for the new product development failure in OSMM. Another valuable information multiple linear regression coefficient table is the beta value for the standardized coefficient which mean the std deviation /variance of all the five-independent variable and dependents variables are 1. Beta value of -0.587 which is the highest number and the negative value further strengthen the dominant of the management style as the root cause for the new product failure in OSMM. The next predictor is the technical expertise /knowledge where the t value is 1.782 with the p value of 0.078 which is higher that the alpha value =0.01 which mean statistically do not have significant association towards the new product development failure in OSMM. The other three independent variable according the t value scoring, cross functional team t=1.410 and the p value is 0.162, job stress level, t= 0.632 with p value of 0.529 and lastly the project management skill t =386 with p value of 0.701 showing all of them are also not significantly associate to the new product failure in OSMM.

4.4 Research Analysis Summary

As an overall summary of analysis findings are that out of five independent variables identified the literature review that are the management style, technical expertise, job stress level, project management skill and cross functional team support, only the management style indicates a statistically significant contribution to the prediction to the new product failure in OSMM. Therefore, null hypothesis (H₀) is accepted and hypothesis (H₆) is rejected as the five independent variables (management style, technical expertise/knowledge, job stress, project management skill, cross functional team support are significantly explaining the variance in the new product development failure in OSMM. Referring to the multiple regression analysis result, it has proven that Based on five independent variables show having positive relation with moderate correlation strength towards the new product development failure where R value of 0.420 or 42%. The Management Style is the only independent variable which shows that there is a significant association between management style and new product development failure Based on the p value of 0.000 where the alpha value is at 0.01. The independent variable management style also has the highest t value of -4.381 and beta value of -587. Based on multiple regression coefficient table 4.2.5 above in Chapter 4, indicates strong correlation and the overall coefficient constant beta (B) at 3.386 which indicated direction of the relationship is positive. The other variables technical expertise/knowledge, jobs stress level, project management skill and cross functional team do not indicate statistically significant impact towards the new product development failure in OSMM. There for the Hypothesis 6 have to accept the null Hypothesis Based on it's the condition of, the five independent variables (management style, technical expertise/ knowledge, job stress, project management skill, cross functional team support are not significantly explaining the variance in the new product development failure.

4.5 Hypothesis Analysis

The Hypothesis H₁ is accepted because the p value is 0.00 which is lower that the alpha value of 0.01. The management style has negative relationship with a moderate strength towards the new product development failure bas on it coefficient correlation value of -0.277. In summary it can be concluded that the independent variable management style has a significant association between management style and new product development failure

Secondly, the significant association between technical expertise /knowledge and new product development failure shows weak associations towards new product development failure. The null hypothesis H_0 is accepted because the p value is 0.574 which is higher than the alpha value of 0.01 and the independent variable, technical expertise/knowledge having positive relationship; anyhow the strength of relationship is weak Based on the coefficient correlation value of 0.057.

Thirdly, the result shows that, the job stress level does have significant association towards new product development failure. The null hypothesis H_0 is accepted because the p value is 0.778 which is higher compared to the alpha value of 0.01 and the coefficient correlation value is -0.029 indicates that the job stress level having negative relationship and the strength of relationship is weak.

Fourthly, the association between project management skill and new product development failure also shows weak associations. The null hypothesis H_0 is accepted because the p value 0.929 which is higher than the alpha value of 0.01 and the coefficient correlation value is -0.009 indicates that the project management skill having negative relationship with strength of relationship is weak. Hence it is concluded that the project management skill does not have significant association towards the new product development failure.

Finally, the association between cross functional team support and new product development failure is weak. The null hypothesis H_0 is accepted because the p value 0.832 is higher than the alpha value of 0.01 and the coefficient correlation is 0.021 indicates that the cross functional team support having positive relationship anyhow the strength of relationship is weak. Therefore, it is concluded that the cross functional team support does not have significant association towards new product development failure.

4.6 Multiple Regression Analysis

Referring to the coefficient correlation table 4.2.5 the constant beta (B) value is 3.386 which indicates positive relationship and directly pointing out the independent variable when is compared individually to the dependent variable is has positive relationship. Management style is the most influencing factors /cause for the new product development failure in OSMM Based on coefficient table 4.2.5 where it's beta value is -0.605, t value -4.381 and the significant p value is 0.000 which is lower than the alpha value 0.01. Based on the table 4.2.3 regression model summary table the adjusted r squared value is 0.132 or 13.20% explaining the variance in the new product development failure. Taking into the consideration of the alternative hypothesis H_6 which the five independent variables (managements style, technical expertise/knowledge, job stress level, project management skill and cross functional team) are not significantly explaining the variance of new product development failure and hence the null hypothesis is rejected and the H_1 is accepted.

5.0 Recommendations

Based on the statistical analysis carried out, the management style has been identified as the biggest contributor for the new product development failure at OSMM. This has pointed out that to reduce the new product failure the management style of OSMM has to be revisited. The type of management style is very broad and subjective as in management there is no right and wrong where it need to use at the right situation. In OSMM context, the first recommendation is to reduce the Autocratic leadership style for the new product development related activities as this will close the door for two-way communication. Furthermore, the subordinates will not perform the task with willingness or passionate with what they are doing, hence the work quality will be missing and the job stress level will increase which indirectly causing the new product development failure. Apart from that the sense of ownership is needed when there is an issue arises, drafting training plan prior to assigning them to the job and also the supervisor need to

allocate time to sit and discuss about the problems and coaching. The manager/ leaders in OSMM need to accept that the population of Y generation is the major population in the market and they need coaching as the educational institution may not able to equip the fresh graduates will all the necessary knowledge. Coaching is not all about giving them the solution. Based on the experience or knowledge but cultivating them to think in deep and finding the solution which can be discussed and weighted thru the experience /knowledge present within or outside of the organization. In some cases, the raw materials or equipment supplier supports can be made available with a cost. The final recommendation will be creating a visionary leadership, whereby this is essential as well in the context of getting OSMM ready for new product technology or market driven factors such as cost reduction, improved cycle time, new environmental regulation requirements and etc. Especially for the new product development, the leader of the department must have a roadmap of what he or she intends to achieve in coming years and how they intend to do it. This roadmap has to clearly explain to the higher management and also the lower level of the employee to understand the importance of the vision or product roadmap. This is found lacking in the new product development leaders in OSMM. Looking back to the recommendation given above there also some foreseen challenges such as the change of the management style could not be done overnight as it need and strategic plan to transform where is requires time money and most importantly the top management blessing.

5.1 Limitations

There are a few limitations found during this research, firstly delay of the respondent returning the questionnaire as they claimed that they are busy with their daily routine job which may cause the respondent to answer the questionnaire in hurry which may lead to inaccuracy, especially on the second or third independent variables. A small percentage of respondent especially employees who are in technician position did not really understand the questionnaire as it is in English. The second recommendation will be implying the coaching leadership in the management style, this is very essential since 50% of the respondent length of service is below 2 years with mean they are new to the company management style and products, in fact in OSMM the fresh graduate population in the new product introduction department above 70% of the population hence there is a high need for a leadership coaching. The fresh engineers need to have a systematic explanation using Malay language was done to benefit the accuracy of the reply to the questionnaire.

5.2 Suggestion for Future Researcher.

Firstly, since the research is social science research using statistical tool to analyze the data for the questionnaire answers it is recommended to use up to 7 likert scale as we are gauging human behavior which tend to chance Based on the respondent mood. Secondly for the new product development failure additional new independent such as the process capability, duration for the new product development can be added to see the impact of the predictors for the new product development failure. Other than the random sampling which is very common in social science research the stratified sampling technique can be used as it will able to be divided into different groups which may essentially provide a different view from the total population linking to technical Based question.

Conclusion

The research on the new development failure in OSMM has given a clue to the research on what is the main factor causing the new product failure, whereas prior to this we were looking at the secondary root cause such as the technical related issue but this social science research has helped to identify the primary root cause, that is the management style in OSMM. Other than that, the technical expertise /knowledge show a positive relationship to the new product as well important ingredient for a success for the new product development. Anyhow the research has

also ruled out the job stress level, project management skill and cross functional team support towards the new product development failure as it has negative direction and the strength of relationship is relatively weak.

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