

OUTSOURCING AND ORGANIZING OF NPD: A SURVEY OF MALAYSIAN INDUSTRY

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ABSTRACT

Malaysian manufacturing firms are interested in New Product Development (NPD) methods, due to the fact that they are competitive tools for survival. The purpose of the present study is to investigate NPD practices in Malaysia, in particular the outsourcing of NPD and the organizing of NPD. We achieved our objectives by conducting a survey of 72 companies in the automotive, chemical, and electrical industries and analyzing the results. Managers involved in NPD will benefit from the findings presented in this paper. The results indicate that the NPD practices used in Malaysian firms focus more on production cost and manufacturability, whereas the need for increased knowledge receives lower priority.

Keywords: outsourcing of NPD; organizing NPD; survey; best practice; Malaysian industry

INTRODUCTION

This study was motivated by the fact that Malaysia's previous heavy dependence on agriculture has gradually shifted to manufacturing. Malaysia now has an export-driven economy boosted by high technology and knowledge-based industries, although the emphasis is changing from pure manufacturing to higher value-added products and activities including research and development (R&D), design and prototyping, logistics, and marketing. According to Berger and Diez (2006), Malaysian firms in the electronics industry exhibit a higher degree of innovation than their counterparts in the neighboring countries of Singapore and Thailand. The present study was designed as a comparison to two previous studies; one on US firms conducted by the Product Development Management Association (PDMA) and presented by Griffin (1997) and another on Swedish firms presented by Rundquist and Chibba (2004). The purpose of both studies was to determine the status of NPD practices.

Many studies of Malaysian industry have focused on regional innovation systems (i.e. Berger & Diez, 2006; Wong, 1999), but to our knowledge this is the first to explore NPD processes in Malaysian firms, with focus on four research areas: formal NPD-processes, NPD Strategies, Outsourcing of NPD activities, and the Organizing of NPD. In this paper some issues from the study are highlighted, with focus on the

status of NPD outsourcing and organizing of NPD in Malaysian firms. The findings can be used as a reference by CEOs and R&D managers in Malaysia. This paper takes the form of a literature review with focus on central concepts, methodological issues, discussion of results, and finally conclusions and managerial implications.

LITERATURE REVIEW

The term “new product” (NP), in general perception has been defined and discussed by several researchers (Booz et al., 1982; Griffin, 1997; and Cooper, 2001). One of their conclusions is that the degree of product newness can vary. PDMA employs the following categorization scheme to clarify the extent to which a product is radically new or merely a modification (Rosenau et al., 1996): new-to-the-world products or really new products, new-to-the-firm products or new product lines, additions to existing product lines, improvements and revisions to existing products, repositioning, and cost reductions. In the present study NPD refers to the two first, and more radical, forms of NP.

In recent decades many researchers have presented various frameworks, methods and models for new product development activities. The motive is to control the time, cost, and quality of NPD. This section will explain the background of NPD outsourcing and organizing with reference to the vast amount of available literature.

Outsourcing of NPD

Outsourcing is defined as procuring or buying products and/or services that are produced by external parties that have previously been produced inhouse (Lacity and Hirscheim, 1993). Thus, only activities which have been produced internally prior to the external procurement qualify as outsourcing. The nature of the transactions, together with the firm’s resource configuration, affects the decision with regard to whether a firm should outsource or produce (buy or make) goods and/or services internally. The transaction cost perspective implies that a product or service should be outsourced if it can be produced at a lower cost externally compared to the internal production cost, bearing in mind that the transaction cost is added to the external cost. Transaction costs comprise the additional costs generated by outsourcing, such as the costs of negotiation, monitoring and legal issues. The transaction costs increase as a result of a high degree of uniqueness in the firm’s knowledge, as well as uncertainty and infrequent outsourcing (Williamson, 1985).

The resource-based view, on the other hand, is supported by Grant’s (1995) five-stage plan for a resource-based approach to strategy formulation. He stresses the necessity of continuously improving and increasing the firm’s resources to fill the gap between the existing and required resources. He asserts that the utilization of both existing and required internal resources, coupled with external acquisition of complementary resources, is a vital element of distinctive competencies that create a competitive advantage for the firm. Grant also mentions that by filling this gap by, for example, outsourcing, the firm’s resources will be maintained and/or increased, which will improve competitiveness and broaden the firm’s set of strategic opportunities.

Strategic outsourcing of innovation is essential in order to gather sufficient knowledge and control the ambiguities of a rapidly changing world (Quinn, 2000). According to Quinn, the outsourcing of almost any stage of the NPD-process can lead to financial benefits. Basic research and early stage development could be outsourced to universities and government laboratories, and advanced development and product innovation to suppliers. Business processes and new product launches could be outsourced to distributors and wholesalers. Firms use outsourcing as a means of

acquiring competencies offered by external suppliers of knowledge. Cycle times, costs, investments and risks can be decreased via the use of more sophisticated outsourcing and new electronic communication, modeling and monitoring techniques.

Feldman (2001) argues that, from the point of view of NPD and product improvement, there appears to be an important hidden cost in outsourcing activities. For instance, the Japanese have continually improved their products over the years through an emphasis on developing suggestions from line workers that could improve production processes, cut costs and sometimes change the nature of the product itself.

O'Connor (1992) states that subcontractors may have better economies of scale; more advanced equipment, and are responsible for employee benefits. The subcontractors are aware that if they fail to provide quality service at a reasonable price, the client firms can hire other suppliers. In-house management is also more likely to respond to service problems by hiring more staff, whereas a subcontractor will respond by ensuring that targets are met without additional costs. O'Connor also states that outsourcing to subcontractors eliminates the invisible costs associated with finding, interviewing, hiring, training and supervising personnel.

NPD organizing

Questions regarding the organizing of NPD have arisen in recent decades and more studies are being carried out to identify new ways of handling or organizing it. Some of the questions are; how best to organize NPD, who should be assigned responsibility for NPD in firms and to whom should the authority to lead NPD projects be delegated. Booz et al. (1968; 1982) found that more than half of the firms used multiple structures to organize NPD. In the 1968 study, Booz et al. identified two basic organizational forms for meeting the specific needs of NPD programs; a permanently-staffed NPD department and a part time new product committee. Permanently-staffed NPD departments are responsible for recommending new products, planning the programs, making screening decisions and directing the progress of the projects at all stages of the NPD process. A new product committee is responsible for the evaluation and coordination of tasks related to new product development on a part time basis.

Other NPD organizational structures were reported by Souder (1987). According to his finding, a functional structure is capable of handling routine problems, well known technologies, a stable environment, low product evolution rates and a well defined market. Meanwhile, others such as Larsen and Gobeli (1988) have revealed that projects developed by means of functional structures were less effective compared to those developed by multi-functional project teams. The reason is that multi-functional project teams have better diversity in terms of perspective, discipline, and functional specialties. Moreover, the team is able to span organizational boundaries and integrate the functional expertise of its members.

THE SURVEY STUDY

In the present study, a mail survey was developed to target a total sample of 915 manufacturing firms. The firms were contacted by phone to confirm the existence of an R&D department, resulting in a list of 250 firms with R&D or NPD departments. Of these, 90 firms agreed to participate in the study and 72 fully completed questionnaires were used in the analysis. The 72 responses were distributed as follows: 55% from the automotive industry, 36% from the chemical industry, and 9% from the Electrical industry.

The participating firms were categorized (Table 1) as large (61%), medium (24%), and small (11%). According to the Malaysian Small and Medium Industries Development Corporation (SMIDEC), the definition of a medium sized firm in the manufacturing sector is an “annual sales turnover between RM10 million and RM25 million or between 51 and 150 full time employees”. The staff category who filled out the questionnaire was mostly R&D managers (33%), general managers (26%), and NPD managers (24%) (see Figure 1).

Company size	Entire sample %	Percentage of best firms	Percentage of rest firms
Small	11	10	12
Medium	24	13	32
Large	61	74	52
No Answer	4	3	4
Total	100	100	100

Table 1: The distribution of participating firms according to size.

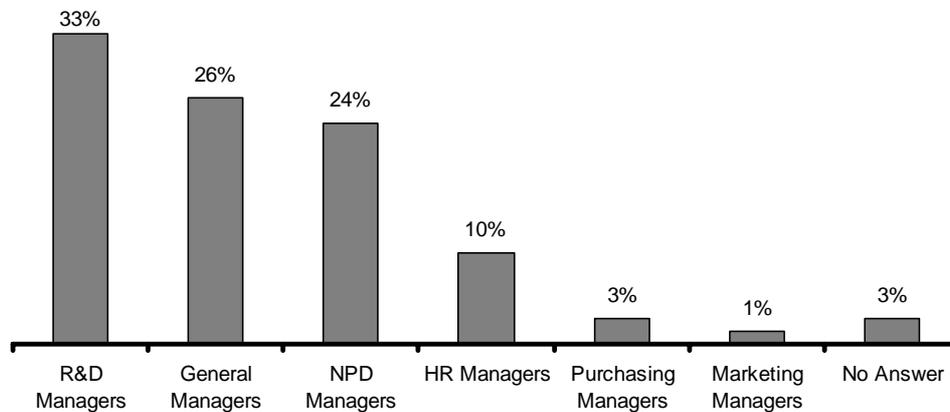


Figure 1: Position of respondents who filled out the questionnaire.

An original questionnaire was developed by the PDMA (Griffin, 1997) to address issues surrounding the product development process; organizing for product development, tools supporting product development, measuring product development, product development outcomes, and background information about respondents. The same questionnaire was later translated into Swedish and used by Rundquist and Chibba (2004) on a sample of Swedish firms. It was employed in this study to allow comparison of the results with those of earlier studies on US and Swedish firms. The main focus of the present study is the following four research areas: formal NPD processes, NPD Strategies, Outsourcing of NPD activities, and the Organization of NPD. The first category of questions classifies the respondents according to industry (automotive, chemical, and electrical) and the firms into best firms and rest firms. Best firms are those with a strong emphasis on NPD, while rest firms have a low emphasis on NPD. The emphasis on NPD was identified by two variables; (A) sales of products developed within the firms as a percentage of turnover and (B) sales of products commercialized in the last five years as a percentage of turnover. The best firms score 50% on both variables. A total of 42% of the sample was identified as best and 58% as rest firms.

The data collected by means of the questionnaire revealed that the best firm group comprised international firms based in Malaysia, Malaysian firms that had been in the

market for almost fifteen years, firms with their R&D departments partially in Malaysia, firms that had reached a certain level that led to stability, and/or Malaysian or international firms that produce products locally but cater for international demand and not the Malaysian market. The rest firm group entirely consisted of Malaysian firms.

RESULTS AND DISCUSSION

In the following section results will be presented and discussed divided into two subsections according to the topics of the paper.

NPD outsourcing

Outsourcing has been and is very much used in the marketplace to improve product development. A very large gap was observed between the best firms and the rest regarding the practice of outsourcing NPD. The best firms outsource NPD to a much higher extent than the rest firms. 80% of the best firm group and 64% of the rest firm group outsource NPD, yielding a total of 71% for the entire sample as presented in Table 2.

	Firms conducting outsourcing of NPD (%)		
	Yes	No	Total
The best	80	20	100
The rest	64	36	100
Entire sample	71	29	100

Table 2: Percentage of firms that conduct outsourcing

Reason for outsourcing	Within best firms (%)	Within rest firms (%)	Within outsourcing firms (%)
Require technological knowledge	7	20	14
Higher effectiveness in the production phase	43	45	44
Reduced cost	33	18	25
Important to outsource to technology leaders	17	10	13
Other	0	8	4
Total	100	100	100

Table 3: Criterion for making the decision to outsource NPD

The group of firms that outsource NPD was asked to state the most important reason for the decision. The majority of those who replied gave more than one reason. Table 3 shows that 44% stated the main reason for outsourcing NPD is greater effectiveness in the production phase, while 25% of the sample affirmed that outsourcing or external production is more cost effective. The remainder of the companies needed technological knowledge that did not exist within their own organization, thus causing them to outsource their product development to technology leaders. An interesting conclusion from these figures is that production cost and

manufacturability appear to be very important to Malaysian firms while the need for more advanced knowledge has less priority.

Firms deciding to outsource their NPD activities most often choose to collaborate with their present suppliers or potential future suppliers. Figure 2 illustrates that 85% of the firms outsource their activities to present suppliers, 74% to potential future suppliers, 71% to present customers, 67% to consultancies, and 58% to potential future customers and universities.

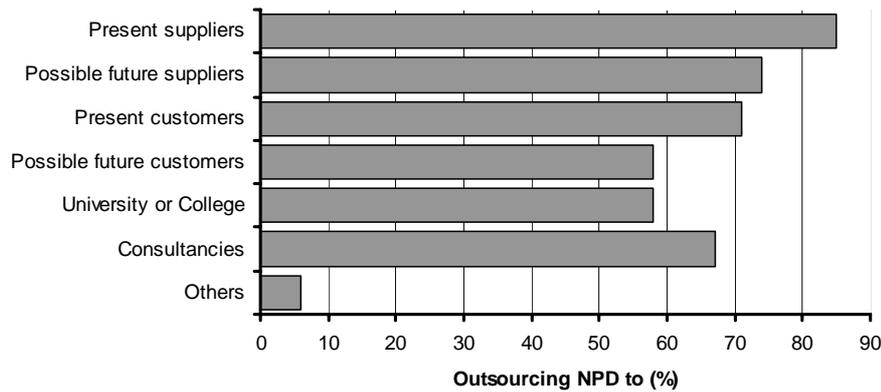


Figure 2: Co-operative partners when a part of the NPD process is outsourced. Only firms that outsource NPD activities were included.

As shown in Table 4, firms that do not outsource claimed that product development should be done internally, thus helping to minimize misunderstandings arising as a result of communication with suppliers, consultants or contractors. They also stated that building an NPD department in the firm is more cost effective in the long term. Compared to the best firms, the rest firms focus a great deal on decisions made by the board of directors on whether to outsource an activity and the significance of this is that the best firms use a decentralized management approach whereby the head of each department is empowered to make departmental decisions while the rest are more accustomed to the classic top-down approach. Effectiveness derived from an internal NPD function (73%) is the most common reason why the rest firms do not outsource their NPD.

Reason for not outsourcing	the best firms (%)	the rest firms (%)
Competence will be drained from our firm	50	27
Cheaper in the long term to build own NPD function	67	73
Misunderstandings will arise during communication	67	53
Strategic decision from the board	0	67

Table 4: Reason for not outsourcing NPD

The Firms in the sample were also requested to rank which function was responsible for initiating the outsourcing of NPD and also the function with the second highest degree of responsibility. Statistics of the result are presented in Table 5. The main function responsible for initiating outsourcing is the R&D department, followed by the production department, purchasing department, marketing department, and finally the logistics and distribution department.

The marketing and purchasing departments play an important role in initiating outsourcing; both of these departments have most contact with customers and suppliers. The R&D department has the main responsibility for initiating outsourcing (68%) in most of the firms in the sample (Table 5).

Function	Initiating outsourcing		Total 1 st & 2 nd (%)
	1 st (%)	2 nd (%)	
Research and Development**	45	22	68
Production**	17	24	41
Purchasing**	19	17	36
Marketing**	13	24	36
Distribution and Logistics	0	8.3	8.3
Others	0	0	0

**chi square, $p < 0.01$

Table 5: Function responsible for initiating the outsourcing of NPD

Besides ranking the function that initiates outsourcing (Table 5), the respondents were also requested to rank the three most important factors behind their choice of outsourcing partners. As can be seen in Table 6, partners that have world class market knowledge is the most important factor for the best firms (46%) unlike the rest, where lower price is the main factor (42%). As stated in the earlier part of this paper, the best firms are those that are fully established, thus partners with world class market knowledge are their preferred choice, as they wish to maintain their position in the market. The importance of world class market knowledge is that the best firms can use it to respond to changes in the business environment.

The rest firms tend to prefer partners who offer them a better price, mainly because the firms in this category are still expanding and as a result, minimizing unnecessary cost is their main motive. Lower price does not mean that the quality of the services provided is bad, but carries sufficient quality to survive in their market.

Interaction between the firms and the partners is very important for strengthening trust and understanding, which in turn will boost the quality of work and results. In both categories of firms, priority is primarily given to regular meetings between firms and partners in order to exchange ideas, technological information and experience gained while carrying out the project. When the parties involved in an outsourcing relationship belong to different cultures, the differences have to be accepted and bridged. Table 7 reveals that the ways of using the results of the outsourced product development activity do not differ a great deal between the best and the rest, thus in simple terms both groups have the same mindset in this regard. The least practiced method of using outsourcing results is the return of drawings and documents. However, direct communication such as meetings between NPD staff and partners to exchange technological information and experience, contacts between financial departments, and meetings between directors to conclude projects, seem to be the key to a healthy business relationship. The cultural understanding between companies can be enhanced by organizing social events, informing about the company background and participating in each other's quality programs.

	The best (%)				The rest (%)			
	1 st	2 nd	3 rd	Total	1 st	2 nd	3 rd	Total
World class market knowledge**	10	33	3	46	17	0	7	24
Located near R&D department	23	7	10	40	5	19	10	34
World class technological knowledge	20	10	10	40	26	0	10	36
Long history with Partner	23	7	7	37	10	21	5	36
Personal relation with staff	7	10	17	34	2	7	14	23
Enough knowledge to solve the problem	13	10	10	33	12	21	5	38
Same cultural area**	0	0	33	33	5	7	5	17
Lowest price	3	20	3	26	14	14	14	42
Speaks the same language	0	3	7	10	0	0	14	14

**Chi square, $p < 0.01$

Table 6: Factors involved in the choice of outsourcing partners

Way of using the results of outsourcing NPD	The best (%)	The rest (%)
Returning drawings and documents	27	21
NPD staff meet with partner, exchange technological info	53	48
Contacts between financial departments	37	31
NPD staff meet with partner to exchange experiences	50	46
Directors meet to conclude project	33	27

Table 7: Ways of integrating the knowledge gained in outsourced product development activity

Organizing NPD

The questionnaire in this study focused on six organizational structures based on the theoretical framework, and the respondents were supposed to indicate all the structures that best describe those of their firm's NPD. As specified in Table 8, the rest firms use permanent staff members (43%) to a much greater extent than the best firms (27%), which can be explained by the fact that most of the best firms had their R&D and NPD departments either partially in Malaysia or entirely overseas, as mentioned earlier. The significant difference is the NP committee (more common among the best than the rest) and NP project owner (more frequent among the rest than the best) responsible for handling NPD activities.

Table 9 shows no significant difference between the best and rest firm groups with regard to responsibility for NPD. 40% of the rest firms had no single function with responsibility for NPD compared to 30% of the best group. Of the remainder of the rest group, 40% indicated Research and Development, 12% strategic planning and 4% engineering and marketing respectively as the function responsible for handling NPD. In the best group 33% indicated R&D, 17% strategic planning and 10% engineering and marketing respectively. In both categories, the R&D department plays a very important role as the function responsible for NPD, a finding that was not unexpected.

Structures	The best (%)			The rest (%)		
	Yes	No	Total	Yes	No	Total
Permanent staff	27	73	100	43	57	100
Projects are conducted by external partners (outsourcing)	33	67	100	43	57	100
A “new product committee” oversees all development efforts *	47	53	100	33	67	100
The general manager of each business unit directs departmental NPD efforts	27	73	100	17	83	100
The process owner of each product development project is responsible for spreading the process to the entire firm **	27	73	100	80	20	100
A single function is responsible for NPD	70	30	100	60	40	100

*Chi square, $p < 0.1$; **Chi square, $p < 0.01$

Table 8: Organizing of NPD

Function responsible for NPD	The best (%)	The rest (%)	Total %
NPD is a joint responsibility	30	40	36
Research & Development	33	40	36
Engineering	10	4	7
Strategic planning	17	12	14
Marketing	10	4	7
Total	100	100	100

Chi square, $p < 0.2$

Table 9: Function responsible for NPD

Reward system for NPD teams

As can be seen in Table 10, the present reward system for team leaders and members seems to be very poor. In this research on Malaysian firms, there is no difference in the reward factor between team leaders and team members, in other words both categories (team leader & team member) are offered the same type of reward upon accomplishment of an NPD project. The reward system for the best and the rest firms is almost identical, thus it can be concluded that the same reward system is applied in both groups.

There are 3 types of rewards that the rest group applies more frequently compared to the best, namely project-based profit-sharing, recognition at an award dinner and articles or acknowledgement in the company magazine. Each culture has its own preferred reward and in Malaysia a project celebration, non financial rewards and articles praising the team leader and members are the most popular. In the best firm, the most frequent reward is project-related stock or stock options as well as project-completion celebration lunches and dinners. For the rest group, recognition during lunches and dinners is the most popular type of reward.

According to the respondents, free gifts, bonuses and incentive schemes are part of the reward program offered in Malaysia. All reward schemes are dependent on the performance of the company as well as that of specific individuals.

Type of rewards N: Never A: Always S: Sometimes	The best (%)		The rest (%)		Best-rest (%)	
	N	A/S	N	A/S	N	A/S
	Project-related profit-sharing	29	71	18	82	23
Project-related stock or stock options	7	93	15	85	13	87
Compensation time	15	85	25	75	22	78
Articles or acknowledgement in company magazine	19	81	9	91	13	87
Recognition at award dinner	15	85	5	95	8	92
Plaques, pins, project photographs	17	83	19	81	18	82
Project-completion celebration lunches, dinners	7	93	8	92	7	93
Non-financial reward chosen by the team (e.g. trips, family dinner)	9	91	9	91	9	91
Other financial rewards (e.g. bonus)	17	83	35	65	31	69
Other non-financial rewards (e.g. gifts)	13	88	64	36	45	55

Table 10: Type of rewards for team leaders and members, categorized and compared between the best and the rest.

CONCLUSION AND MANAGERIAL IMPLICATIONS

The findings of this study can serve to evaluate the current status of NPD practices in Malaysia. In addition, the results from the rest firm group made up exclusively of Malaysian firms and the best firm group, which is a mixture of Malaysian and international firms, can provide insight for managers. The study did not distinguish between Malaysian firms and international firms, as the sole criterion was having a production line in Malaysia. A summary of NPD practices can be found in Table 11.

NPD outsourcing is widely practiced in Malaysian firms to achieve lower production costs as well as efficient manufacturing. The superior technological knowledge of the outsourcing partner is not a high priority, in contrast to world class market knowledge. An innovative outsourcing strategy to deal with component production suppliers is more effective than engaging in product development. The firms that do not outsource NPD seem to have achieved the lower internal production costs without resorting to this method.

The organization of NPD is not a completely internal function in these firms, due to the fact that the R&D department is partly located overseas and/or the high frequency of outsourcing in Malaysia. However, R&D is mainly responsible for NDP organization and therefore the chief initiator of outsourcing. The Malaysian economy is considered to be one of the fastest growing in the world. A study conducted by Ramasamy et al. (2004) shows that the entrepreneurial structure is developing in Malaysian firms. Newer firms that are still growing have not yet developed a full-scale organizational structure.

In order to improve future research on NPD best practices, the limitations of this study should be mentioned. Firstly, a very high response rate was expected from the electrical and electronics industry, due to it being one of the major sectors in Malaysia. However, only 9% of this study covers that sector. The low response rate is due to the fact that most of the companies showed little interest in participating in the

study. Secondly, the response rate in general was not as high as expected, which can be attributed to several reasons, namely the length of the questionnaire, difficulty in contacting the right person, and lack of interest on the part of staff in participating in surveys. The companies were offered an executive report of the results for reference purposes and instructed to indicate their interest by including a business card with the returned questionnaire. Surprisingly, very few companies requested the report.

<p>Outsourcing of NPD</p>	<p>71% of firms outsource part of the NPD-process</p> <p>Reason for outsourcing: greater effectiveness in the production phase (44%) and lower cost (25%)</p> <p>Outsourcing of NPD to: Present suppliers (85%). Future supplier (74%) Present customer (71%) Consultancy firms (67%). Universities (58%) Future costumer (58%)</p> <p>The outsourcing of NPD is most often initiated by R&D (68%) followed by the Production department (40%), Purchasing department (38%) and marketing department (38%)</p>
<p>Organizing NPD</p>	<p>The most common structure in the total sample seems to be “A single function is responsible for NPD” (64%). The second most common appears to be “The process owner of each product development project is responsible for spreading the process to the entire firm.” (62%).</p> <p>R&D and NPD as a Joint responsibility are most common function in terms of responsibility for NPD (36% each), followed by the strategic planning function (14%), Engineering function and Marketing function (7% each)</p> <p>The most popular rewards for NPD project teams and project leaders are project-completion celebration lunches, dinners (93%) and recognition at award dinner (92%), followed by non-financial rewards chosen by the team (e.g. trips, family dinner) (91%). Relatively speaking, there was no difference between the reward system for the best and the rest firms.</p>

Table 11: summary of the findings

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