Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5, 195-206
2024
Publisher: Learning Gate
DOI: 10.55214/25768484.v8i5.1681

The perception of micro-enterprises on the constraints encountered in research and development (R&D): Evidence from Malaysia

Nadiah Abd Hamid[1], Noorlaila Ghazali[2*], Nor Syafinaz Shaffee[3], Zuraeda Ibrahim[4], Nik Mohd Norfadzilah[5]
[1,3,4]Faculty of Accountancy, Universiti Teknologi MARA, Puncak Alam Campus, Malaysia; nadiah201@uitm.edu.my (N.A.H) norsyafinaz@uitm.edu.my (N.S.S) zurae229@uitm.edu.my (Z.I)
[2]Faculty of Accountancy, Universiti Teknologi MARA Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor; noorl278@uitm.edu.my (N.H)
[5]Faculty of Business and Management, Universiti Sultan Zainal Abidin, Terengganu, Malaysia; nikmfadzilah@unisza.edu.my (N.M.H)

Abstract: Engagement in research and development (R&D) is crucial not only for large companies but also for micro businesses. For micro enterprises, R&D can lead to innovation, which enable the development of new products and improve existing ones. This innovation is vital for micro-enterprises to stay competitive and build on their ability to meet the customers' evolving needs. Potentially, R&D also helps micro businesses enhance their operational efficiency, reduce costs, and adopt sustainable practices, which are all essential for long-term viability. Unfortunately, micro-enterprises often encounter significant difficulties in engaging with R&D activities. Past studies have highlighted on the primary barriers for micro-enterprise to get involve with R&D such as limited financial resources, lack of access to advanced technology, and insufficient expertise. This paper examines the hurdles faced by Malaysia's micro-enterprises in engaging with R&D activities. A questionnaire survey was conducted and 2,000 questionnaires were distributed, with 202 usable responses available for analysis. The study found that the availability of financial incentives for asset and working capital needs are positively viewed, but difficulties persist in securing loans for modern agriculture, digital transformation, and Shariah compliant businesses. While R&D boosts business growth and competitiveness, its impact on reducing operational costs and ensuring sustainability are unclear. Incubator centers provide valuable support but the lack of comprehensive mentorship programs has imposed difficulties for micro-enterprises to utilize the facilities. The findings give a clear indication to policymakers that enhancing support mechanisms is crucial in order to fully leverage the financial and R&D incentives for micro-enterprises.

Keywords:

1. Introduction

In the dynamic landscape of Malaysia's economy, micro-enterprises play a significant role in driving innovation and economic growth. These small-scale businesses are often constrained by limited resources and volatile market share, and they face significant challenges in maintaining competitiveness (Saleh & Ndubisi, 2006; Hashim, 2011). One of the critical avenues in improving the sustainability and potential growth of their business is through Research and Development (R&D) activities. However, the high costs and risks associated with R&D pose substantial barriers for micro-enterprises (Karim et al., 2008; Nor et al., 2011). To address these challenges, Malaysia has implemented various support mechanisms, including incubator centers, financial incentives, and tax incentives through the 11th and 12th Malaysian Plan 2016-2025. This paper explores the ecosystem of these related elements in

* Correspondence: noorl278@uitm.edu.my

promoting R&D among Malaysian microenterprises, by highlighting their importance in fostering a vibrant and innovative entrepreneurial ecosystem.

Incubator centers serve as the vital support hubs for micro-enterprises which offers a nurturing and collaborative environment that promotes innovation and business growth. These centers provide a range of services, including mentorship, networking opportunities, and access to advanced technologies and expertise (Aernoudt, 2004; Ismail et al., 2015). Overall, the centers help to enhance and mitigate some of the inherent risks and challenges faced by micro-enterprises. With the help of the incubator centers, these businesses are able to focus on developing innovative solutions and products. Furthermore, the collaborative environment within the incubator centers facilitates knowledge exchange and synergistic partnerships, which are indeed fundamental for successful R&D endeavors (Bergek & Norrman, 2008; Ratinho & Henriques, 2010). Hence, this paper examines how the presence and effectiveness of the incubator centers in Malaysia contribute towards the enhancement of the R&D capabilities of micro-enterprises.

Equally important are the role of financial and tax incentives which contribute in encouraging micro-enterprises to invest in R&D. Financial incentives, such as grants, loans, and subsidies can provide funding opportunities that help micro-enterprises to overcome the financial constraints associated with R&D activities (Mohamed et al., 2010; Rasiah & Chandran, 2009). These financial incentives lower the initial investment required and enable businesses to embark on more ambitious and innovative projects. Additionally, the tax incentives also offer substantial cost savings by allowing deductions, credits, and exemptions on R&D expenditures incurred by the businesses (Boeing, 2016; Hall & Van Reenen, 2000).

The reduction of the overall financial burden and tax incentives make R&D a more viable and attractive option for micro-enterprises. However, there is no specific R&D tax incentive designed for micro-enterprises in Malaysia. Exploring this issue is vital to provide beneficial evidence for the policymakers to effectively craft the relevant and targeted R&D incentives particularly for micro-enterprises. R&D tax incentives will provide micro enterprises with the financial support and motivation needed to encourage them to invest in sustainable practices, such as R&D. This not only helps in easing their environmental impact but also enhances their competitiveness, operational efficiency, and long-term viability. This paper delves into the specific financial and tax incentives available in Malaysia and assesses their impact on the R&D landscape among micro-entrepreneurs, which ultimately highlights the need for a well-coordinated approach to maximize their effectiveness.

2. Literature Review

2.1. The Role of Malaysia's Incubator Centers in Promoting R&D

Incubator centers have emerged as a significant component of institutions in the promotion of research and development (R&D) among micro-enterprises and small and medium-sized enterprises (SMEs) in Malaysia. These centers provide a comprehensive support system that includes infrastructure, mentoring, networking opportunities, and access to funding and technical expertise (Ismail et al., 2018; Hashim, 2011). The primary goal of these incubators is to mitigate the high risks and costs associated with R&D activities, thus, enabling microenterprises to focus on innovation and growth. Studies have shown that the collaborative environment fostered by incubator centers enhances the knowledge and skill sets of entrepreneurs which leads to higher success rates in product development and market entry (Salman & Arshad, 2016; Aernoudt, 2004). The presence of incubator centers is linked to increased commercialization of R&D outputs, as they facilitate connections between academia, industry, and government agencies (Bergek & Norrman, 2008).

The effectiveness of incubator centers in Malaysia is also attributed to their role in nurturing a culture of innovation and entrepreneurship. The Malaysian government's initiatives, such as National Incubator Network and Malaysia Digital Economy Corporation (MDEC), have been instrumental in establishing and supporting these incubators (MDEC, 2018). These initiatives aim to create a conducive ecosystem for startups and micro-enterprises by providing financial incentives, regulatory support, and

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

access to global markets. Research indicates that incubator centers that offer specialized programs tailored to the needs of specific industries, such as technology or biotechnology, are particularly successful in driving R&D activities (Chandra & Fealey, 2009; Mohd Sani et al., 2018). The continuous interaction and feedback within the incubator ecosystems help to refine business models and accelerate the development of innovative products and services (Ratinho & Henriques, 2010). The incubator centers enhance the R&D capabilities of micro-enterprises in Malaysia and contribute significantly to the country's economic development and competitiveness.

2.2. Government's Financial Incentives in Encouraging R&D Activities Among Micro-Enterprises.

Financial incentives provided by the government through various schemes also help to stimulate research and development (R&D) activities among micro-enterprises. These incentives, which include grants, loans, and subsidies, help to alleviate the high costs and financial risks associated with R&D, making it more accessible for smaller firms (Hussain et al., 2018; Beck & Demirguc-Kunt, 2006). According to David et al. (2000), financial incentives reduce the initial capital requirements for micro-enterprises and encourage them to undertake more innovative projects with long term benefits. The Malaysian government's Technology Acquisition Fund (TAF) and Commercialization of R&D Fund (CRDF) have been effective in promoting R&D among local businesses by providing substantial financial support (MIDA, 2019). These programs have shown significant progress in the capacity of micro-enterprises to innovate and compete in the global market (Rasiah & Chandran, 2009).

Studies showed that targeted funding schemes which address specific industry needs and technological gaps proved to be particularly effective (Lerner, 2009; Czarnitzki & Lopes-Bento, 2014). In Malaysia, the focus on high-tech and knowledge-intensive industries has led to more dynamic and diversified economic inclusivity. Financial incentives complemented by other support measures such as tax incentives and regulatory facilitation, create more conducive environment for R&D (Mansfield, 1995; Wonglimpiyarat, 2011). OECD (2015), suggested that continuous monitoring and evaluation of incentives are critical to ensure they meet the evolving needs of microenterprises and achieve the desired outcomes. A robust R&D ecosystem through financial incentives helps the government in supporting the growth of micro-enterprises as well as enhancing the overall innovation capacity of the country.

2.3. Tax Incentives as Means of Encouragement to Micro-Enterprises

Tax incentives are widely recognized as a powerful tool to encourage research and development (R&D) activities among micro-enterprises. These incentives, including tax credits, deductions, and exemptions, can significantly reduce the financial burden associated with R&D expenditures, therefore, making it more feasible for smaller firms to engage in innovative activities (Cunningham et al., 2013; Hall & Van Reenen, 2000). In Malaysia, initiatives such as Investment Tax Allowance (ITA), Pioneer Status (PS) and Double Deductions have been implemented to stimulate R&D investment among businesses (MIDA, 2020). These schemes allow businesses to deduct an allowable portion of their R&D costs from their taxable income, which provide immediate financial relief and encourage reinvestment into further innovation. Studies have shown that tax incentives can lead to substantial increases in private R&D spending, particularly, among small and medium-sized enterprises (SMEs) (Bloom et al., 2002; Czarnitzki et al., 2011).

The effectiveness of tax incentives in promoting R&D among micro-enterprises is also influenced by the design and implementation of effective policies. Well-structured tax incentives that are easy to access and understand tend to have a higher uptake and yield greater impact (Appelt et al., 2016; Westmore, 2013). In Malaysia, continuous efforts are taken to streamline the application processes with the aim to ensure that the tax incentives reach their intended beneficiaries (Abd Rahman et al., 2016). Additionally, the targeted tax incentives that focus on high-growth sectors, such as information technology and biotechnology, have been especially successful in driving innovation (Dimos & Pugh, 2016). With the intention of fostering a favorable tax environment for R&D, the government can

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

support the growth of micro-enterprises and also contribute to the broader objective of economic development and technological advancement.

3. Methodology

In this research, a questionnaire survey was used to gather valuable information from micro-enterprise owners across Malaysia. The primary focus was to explore the roles of incubator centers, financial incentives, and tax incentives in encouraging micro-entrepreneurs to participate in Research and Development (R&D) activities. The study ensured that the strategic selection of respondents was drawn from a diverse pool of micro-entrepreneurs throughout Malaysia, so as to represent the various business segments. Collaborations with industry associations and organizations further broadened the pool of respondents, thereby, enhancing the reliability of the data collected. A total of 2,000 questionnaires were distributed through both physical and online channels, resulting in the final collection of 202 usable responses available for analysis. The survey framework facilitated an in-depth examination of how different support mechanisms impacted micro-enterprises engagement in R&D.

The quadrant analysis is employed in this study to identify the strengths and weaknesses of the responses from micro-entrepreneurs in relation to the importance of R&D to their businesses, the support from incubators, and the availability of the financial and tax incentives in encouraging them to venture into R&D activities in Malaysia.

4. Results

4.1. Tax Incentives Encouragement for Micro-Enterprises to Undertake R&D

The descriptive statistics (Table 1) from the quadrant analysis shown in Figure 1 indicate strengths for C3 and C8 with mean values of 3.114 and 3.178 respectively, suggesting that respondents agree that R&D activities significantly help reduce the total tax payable by companies and also find the processes for obtaining tax reduction incentives from both MIDA and the LHDN relatively efficient, respectively. However, C4 with a mean value of 2.837 falls within the weakness column indicating the challenges that micro-enterprises encounter in receiving capital allowance incentives for R&D asset investments. Additionally, C5 with a mean of 2.970 is similarly close to the weakness column which also suggests challenges for micro-enterprises benefiting from R&D tax incentives from the LHDN, such as double tax deductions, which can reduce a company's tax rate.

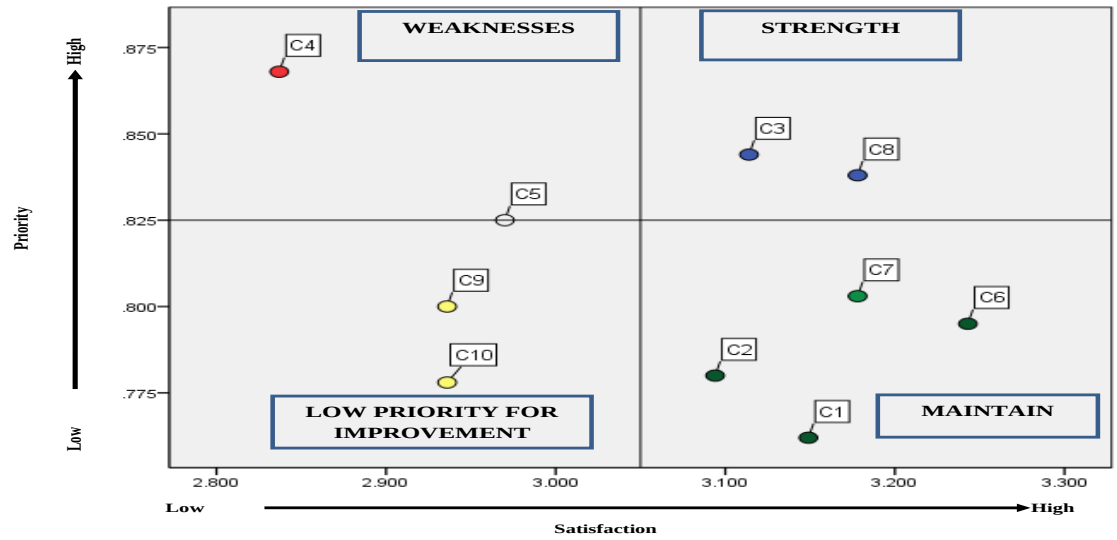

Figure 1.
Tax incentives to encourage R&D activities.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

Table 1.
Responses on tax incentives and & R&D.

Item	Description	Mean	St.Dev
C1	My company has access to infrastructure facilities such as land, factory location, electricity and water supply, telecommunications, and others.	3.149	1.3814
C2	My company receives fast approval related to Building Plans, Qualification Certificates, and Business Licenses.	3.094	1.3105
C3	My company undergoes research and development (R&D) activities to receive tax deduction incentives provided by the government.	3.114	1.1936
C4	My company receives capital allowance incentive for asset investment in research and development (R&D).	2.837	1.2806
C5	The research and development (R&D) tax incentive from the Inland Revenue Board of Malaysia (LHDN), for example, double tax deduction, can reduce the tax rate for my company.	2.970	1.2254
C6	Research and development (R&D) activities can reduce the amount of tax that needs to be paid.	3.243	1.0630
C7	It is a fast process to receive tax reduction incentive for research and development (R&D) activities from MIDA.	3.178	1.1188
C8	It is a fast process to receive tax reduction incentive for research and development (R&D) activities from Inland Revenue Board of Malaysia (LHDN).	3.178	1.1451
C9	My company is involved in research and development (R&D) activities because we are attracted to the tax reduction incentive provided by MIDA.	2.936	1.1156
C10	My company is involved in research and development (R&D) activities because we are attracted to the tax reduction incentive provided by Inland Revenue Board of Malaysia (LHDN).	2.936	1.1377

4.2. Government Financial Incentives to Encourage R&D Activities Among Micro Enterprises

The statistics from the quadrant analysis illustrated in Figure 2 reveal the various financial schemes measures for micro-entrepreneurs related to economic sectors intended to fund asset and working capital needs (D3) with a mean value of 3.965; loans aim to finance capital expenditures, working capital, and the development of advanced agro-food projects (D4) with a mean value of 3.955, and the grants for companies to participate in structured intervention programs aim to assist companies in developing capacity and production capabilities for entry into export markets (D10) with a mean value of 3.955 are viewed positively with good strengths. However, there is concern about D6 - D9 which score mean values ranging from 3.822 to 3.812 as they fall under the category of the weakness column of the quadrant analysis, considering the relative average of the mean values under this category of responses. This suggests that there are significant concerns and challenges for micro-enterprises in accessing loans which are intended to finance working capital expenses (D6); loans to facilities micro-entrepreneurs in modern agriculture aim to fund capital and operational expenses for agriculture (D7); loans to technology companies aim to finance capital and operational expenses for digital transformation (D8); and loans to professionals whose businesses are *Shariah* compliant and intended to finance working capital, purchase machinery & equipment, and refurbish premises (D9).

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

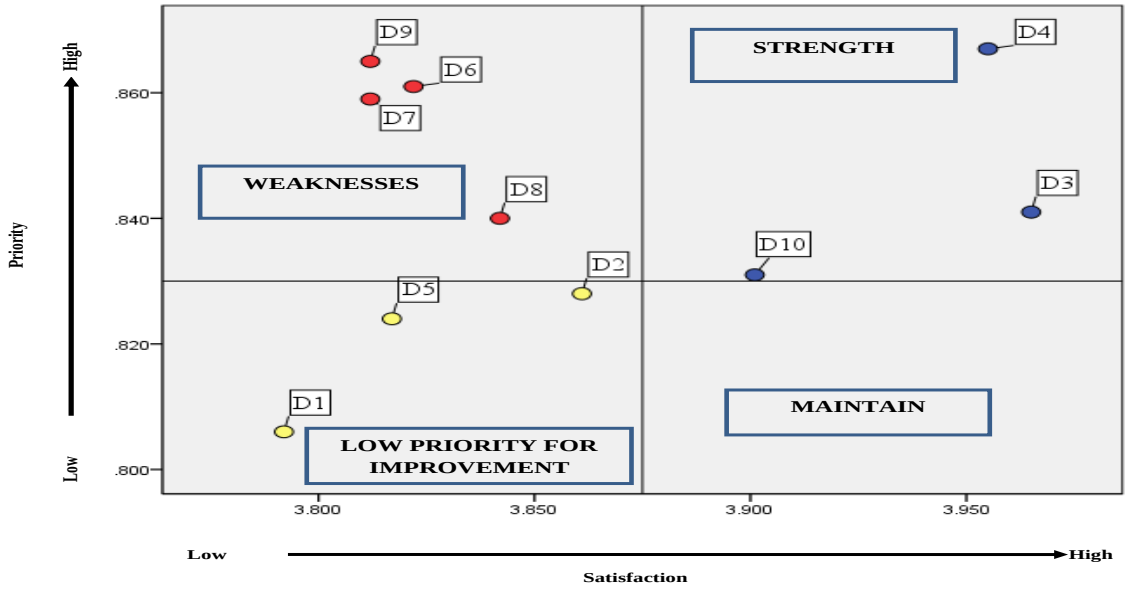

Figure 2.
Government financial incentives for R&D.

Table 2.
Responses on financial incentives related to R&D.

Item	Description	Mean	St.Dev
D1	The maintenance of electricity tariffs for micro-enterprises and companies involved in the food and agriculture sector aims to reduce the burden on business sustainability.	3.792	1.0155
D2	The loans provided to micro-enterprises are intended to finance the purchase of equipment, machinery, ICT tools, IT solutions and services, technological support, and many more.	3.861	.9777
D3	The financing scheme for micro-enterprise enterprises related to the economic sector aims to fund asset and working capital needs.	3.965	.9639
D4	Loans to micro-enterprises are intended to finance capital expenditure, working capital, and the development of advanced agro-food projects.	3.955	.9320
D5	Loans to micro-enterprises in all sectors aim to finance capital or working capital expenditures to initiate the transition of business operations to low-carbon and sustainable operations.	3.817	.9203
D6	Loans to micro-entrepreneurs include part-time workers using digital platforms or working independently, aiming to finance working capital expenditures.	3.822	.8966
D7	The loan facilities for micro-enterprise enterprises in the modern agricultural sector are intended to finance capital and operational expenses in farming.	3.812	.9165
D8	Loans to technology companies are intended to finance capital and operational expenses towards digital transformation.	3.842	.9276
D9	Loans to professionals whose businesses are Sharia-compliant aim to finance working capital, and purchase machinery & equipment, and premises renovation.	3.812	.9433
D10	Grants for companies to participate in structured intervention programs aim to assist companies in developing capacity and production capabilities for entry into export markets.	3.901	.9568

4.3. The Importance of R&D Activity Among Micro-Enterprises

The quadrant analysis results presented in Figure 3 which are drawn from the descriptive analysis (Table 3) indicate strengths for E1 (3.936), E3 (3.955), E5 (3.936), E9 (3.985), and E10 (3.950). This finding suggests that micro-entrepreneurs believe that R&D activities contribute to the creation of cutting-edge products that are more competitive (E1); R&D activities contribute to the improvement of the company's production, enhancing the marketability of products at domestic and international levels (E3); R&D activities are crucial in assisting the production of high-quality, valuable products, protected by patents, trademarks, or copyrights (E5); R&D activities provide opportunities for businesses to export products internationally (E9); and R&D activities open opportunities for businesses to establish

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

networking or business relationships with partners from both domestic and international markets. However, the weakness column indicates that micro-enterprises do not agree that R&D activities is an innovation to reduce operational costs and daily business operations E2 (3.891); investment in R&D activities contribute to the sustainability of the business E4 (3.827); and R&D activities facilitate the registration of products for the purpose of obtaining patents, trademarks, or copyrights E6 (3.881).

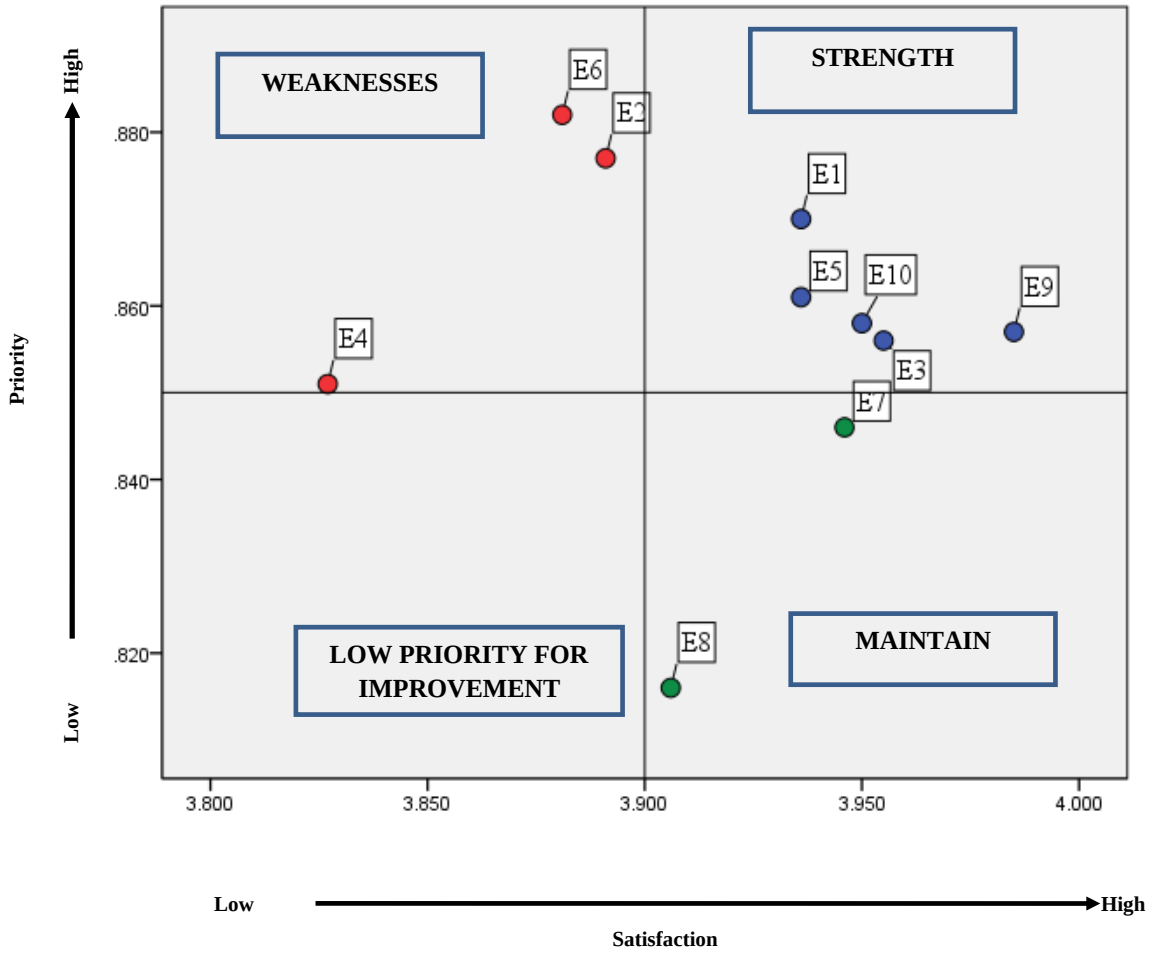

Figure 3.
R&D activities among micro-enterprises.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

Table 3.
Responses on R&D activities.

Item	Description	Mean	St.Dev
E1	Research and development (R&D) activities contribute to the creation of cutting-edge products that are more competitive.	3.936	.8982
E2	Research and development (R&D) activities is an innovation to reduce operational costs and daily business operations.	3.891	.9609
E3	Research and development activities contribute to the improvement of the company's production products, enhancing the marketability of products at both domestic and international levels.	3.955	.9583
E4	Investment in research and development (R&D) activities contributes to the sustainability of the business.	3.827	.9488
E5	Research and development (R&D) activities are crucial in assisting the production of high-quality, valuable products, protected by patents, trademarks, or copyrights.	3.936	.9415
E6	Research and development (R&D) activities facilitate the registration of products for the purpose of obtaining patents, trademarks, or copyrights.	3.881	.9493
E7	Research and development (R&D) activities can enhance the competitiveness of the business.	3.946	.9421
E8	Research and development (R&D) activities conducted by the business can help attract the interest of financing or venture capital companies.	3.906	.9283
E9	Research and development (R&D) activities provide opportunities for businesses to export products internationally.	3.985	.9276
E10	Research and development (R&D) activities open opportunities for businesses to establish networking or business relationships with partners from both domestic and international markets.	3.950	.9555

4.4. The Role of Malaysia's Incubator Centers in Promoting R&D Among Micro-Enterprises

Figure 4 below shows the descriptive results (Table 4) from the quadrant analysis which indicate strengths for J1 (3.327), J5 (3.337), J6 (3.391). These results suggest that micro-entrepreneurs agreed that they have obtained various information regarding the facilities of Incubator Centres for R&D (J1); they are satisfied with the results of the R&D products carried out at the incubator centers; and the incubator centers provide advisory and consultancy services in terms of marketing, human resources, consultancy, and finance, as well as ways to improve the quality of output and organizational productivity. However, the weaknesses are observable with J4 (3.281) and J7 (3.218) indicating micro-entrepreneurs' disagreement that they have received adequate guidance and encouragement to conduct R&D at the incubator centers in Malaysia; and that they have joined mentor-mentee programs provided by the incubator centers to enhance their business through training, guidance, research, and development.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

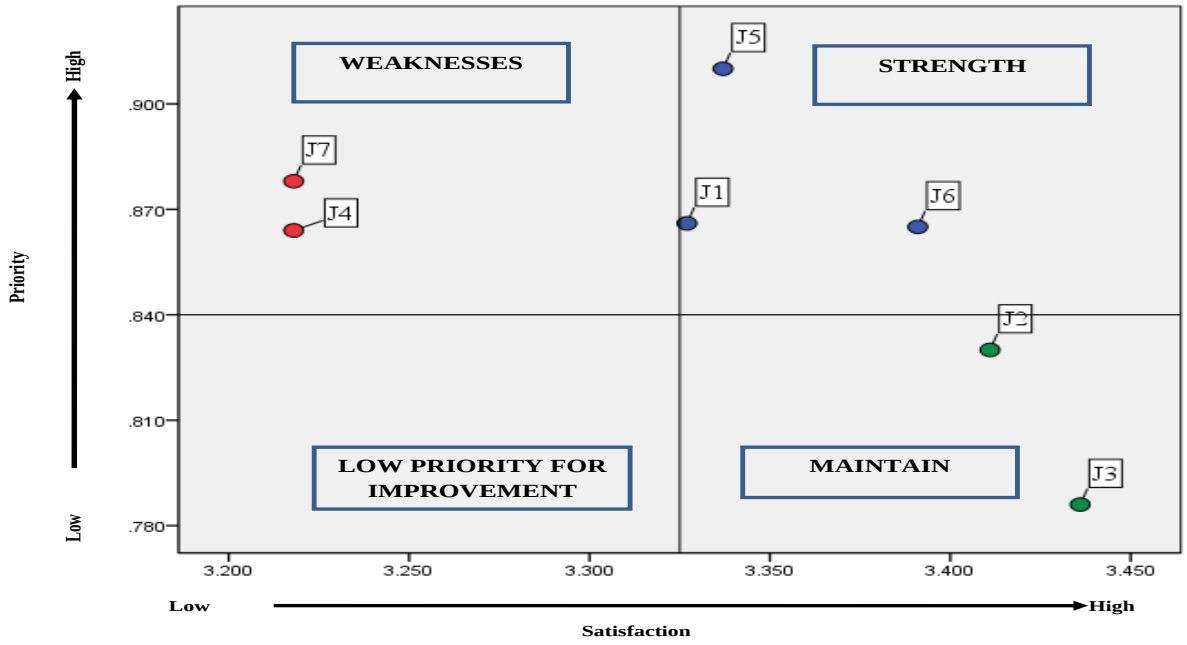

Figure 4.
Incubators in promoting R&D.

Table 4.
Responses on incubators and R&D activities.

Item	Description	Mean	St.Dev
J1	I have obtained various information regarding the facilities of Incubator Centres for Research & Development (R&D) such as MARDI, SIRIM, MARA, PUNB, MEDEC UiTM, MATRADE & SME Corp. Malaysia.	3.327	1.0846
J2	The staff at the Incubator Centres are very helpful for micro, small, and medium enterprises (MSMEs) in conducting Research & Development (R&D).	3.411	1.0146
J3	There are many facilities and assets provided at the incubator centres for the convenience of conducting research & development (R&D).	3.436	.9507
J4	I have received a lot of guidance and encouragement to conduct research & development (R&D) at the incubator centres in Malaysia.	3.218	1.0280
J5	I am satisfied with the results of the research & development (R&D) products carried out at the incubator centres.	3.337	1.0441
J6	The incubator centres provide advisory and consultancy services in terms of marketing, human resources, consultancy, and finance, as well as ways to improve the quality of output and organizational productivity.	3.391	1.0464
J7	I have joined mentor-mentee programs provided by the incubator centres to enhance my business through training, guidance, research, and development (R&D).	3.218	1.1339

5. Discussions

The results of the study showed that Malaysian micro-entrepreneurs strongly agreed that R&D activities significantly help in reducing the total tax payable by companies. Entities operating within the category of micro-enterprises can significantly benefit from engaging in R&D activities by utilizing the tax incentives provided by Malaysian Investment Development Authority (MIDA), and Inland Revenue Board of Malaysia (IRBM) to reduce their tax liability. This finding is consistent with Cunningham et al. (2013); Hall & Van Reenen (2000) that tax savings can help micro-businesses to increase reinvestment in R&D activities for the purpose of improving products based on customer demand, refining processes, and gaining new market share. In addition, the processes for obtaining tax reduction

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

incentives from MIDA and IRBM are perceived as relatively efficient. These findings suggest that micro-entrepreneurs believe in the policies governing incentivizing R&D activities within these institutions are effective and efficient, thereby, fostering innovation and growth among micro-enterprises.

Despite realizing these strengths, the entrepreneurs believed that there are critical challenges within the framework of tax incentives which include difficulties in receiving capital allowance incentives for R&D asset investments. This implies that tax incentives relating to capital allowance through investment in capital projects may involve the purchasing of heavy machinery which attracts capital allowance, are difficult to obtain and utilize by micro-entrepreneurs. Furthermore, micro-entrepreneurs also faced challenges associated with other R&D tax incentives, such as double tax deductions. The benefits of double tax deduction significantly served as a motivation for micro-enterprises to increase spending toward R&D activities. This highlights the need for more streamlined and accessible processes to ensure that microenterprises can fully leverage available tax incentives for their R&D investments.

The financial incentives analysis indicates positive views are held for measures related to funding of asset and working capital needs, such as loans aimed at financing capital expenditures, working capital, advanced agro-food projects, and grants for participating in structured intervention programs to develop capacity and production capabilities for export markets. The findings are consistent with Hussain et al. (2018); Beck & Demirguc-Kunt, (2006) who indicated that financial incentives can help to mitigate the high costs and financial risks associated with R&D, by making it more accessible for smaller firms. However, significant concerns arise from the weaknesses identified in the analysis, indicating challenges for micro-enterprises in accessing loans for working capital expenses, modern agriculture, digital transformation, and *Shariah*-compliant businesses. These challenges highlight the need for improved accessibility and support for micro-enterprises seeking financial assistance in these critical areas.

The findings demonstrate that most micro-entrepreneurs agreed on the substantial contribution of R&D to the growth and sustainability of their businesses. Strengths are evident in areas such as the creation of competitive products, improvement of production processes, production of high-quality, valuable products, opportunities for international export, and networking with domestic and international partners. These strengths highlight the significant role of R&D in enhancing the competitiveness and marketability of microenterprises' products and services. However, weaknesses in the significance of R&D activities to micro-businesses also suggest that micro-entrepreneurs do not perceive R&D activities as effective enough in reducing operational costs or contributing to business sustainability. Besides that, they face challenges in registering products for patents, trademarks, or copyrights. These weaknesses suggest that while R&D is beneficial in several key areas, there are still some significant gaps in its impact on operational efficiency and long-term sustainability.

The findings of this study indicate that incubator centers contribute by supporting R&D activities among micro-enterprises. Strengths in this area include obtaining information about the available facilities, satisfaction with R&D product outcomes, and the provision of advisory and consultancy services. The findings are congruent with those of Ismail et al. (2018); and Hashim (2011) who suggest that incubator centers provide a comprehensive support system that includes infrastructure, mentoring, networking opportunities, and access to funding and technical expertise. Nevertheless, weaknesses are also evident in the areas of guidance and encouragement to conduct R&D and participation in mentor-mentee programs. These findings suggest that while incubator centers provide valuable resources and support, there is a need for more comprehensive guidance and mentorship programs to optimize their impact.

6. Conclusions

The study reveals that Malaysian micro-entrepreneurs recognize the significant benefits of R&D activities in reducing tax liabilities, which are facilitated by efficient processes and policies from relevant

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681

authorities such as, Malaysian Investment Development Authority and Inland Revenue Board of Malaysia. Generated tax savings enable micro-businesses to reinvest in R&D, intensify product innovation, improve processes, and widen their market reach. The positive perception of these tax incentives indicates that more augmented policies are required within these institutions that can advance innovation and growth among micro-enterprises. However, challenges persist in obtaining capital allowance incentives for R&D asset investments and leveraging double tax deductions, highlighting the need for more streamlined and accessible processes to maximize the benefits of these tax incentives.

This study has unveiled the key challenge of micro-enterprises in engaging with R&D initiatives which primarily involved with issues of financing. Largely, micro-entrepreneurs have positive views on financial incentives for funding asset and working capital needs, such as loans for capital expenditures and advanced agro-food projects, as well as grants for export market capacity building. To corroborate their positivity, this requires the government and its satellite institutions to provide robust and sustainable financial incentives that will stimulate growth for micro-entrepreneurs. Significant challenges remain in accessing loans for working capital, modern agriculture, digital transformation, and *Shariah*-compliant businesses. Apparently, the support provided by incubator centers, including advisory and consultancy services are valuable, but there is a need for more comprehensive guidance and mentorship programs to fully leverage the untapped potential of micro-entrepreneurs. These findings accentuate the necessity for enhanced support mechanisms to address the challenges faced by micro-enterprises in accessing financial and R&D incentives, thereby promoting sustained innovation and growth.

Acknowledgement:
The authors are grateful to Universiti Teknologi MARA (UiTM) for the financial assistance provided.

References
[1] Abd Rahman, R., Yaacob, Z., Mat Radzi, R., & Saman, H. M. (2016). The impact of tax incentives on the performance of SMEs. Procedia Economics and Finance, 35, 248-256.
[2] Aernoudt, R. (2004). Incubators: Tool for entrepreneurship? Small Business Economics, 23(2), 127-135.
[3] Appelt, S., Galindo-Rueda, F., & Gonzalez Cabral, A. (2016). Measuring the link between R&D tax incentives and R&D investment. OECD Science, Technology and Industry Working Papers, 2016/05, OECD Publishing.
[4] Bergek, A., & Norrman, C. (2008). Incubator best practice: A framework. Technovation, 28(1-2), 20-28.
[5] Boeing, P. (2016). The allocation and effectiveness of China's R&D subsidies—Evidence from listed firms. Research Policy, 45(9), 1774-1789.
[6] Chandra, A., & Fealey, T. (2009). Business incubation in the United States, China, and Brazil: A comparison of the role of government, incubator funding, and financial services. International Journal of Entrepreneurship, 13, 67-86.
[7] Czarnitzki, D., & Lopes-Bento, C. (2014). Innovation subsidies: Does the funding source matter for innovation intensity and performance? Empirical evidence from Germany. Industry and Innovation, 21(5), 380-409.
[8] Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. Journal of Banking & Finance, 30(11), 2931-2943.
[9] Bloom, N., Griffith, R., & Van Reenen, J. (2002). Do R&D tax credits work? Evidence from a panel of countries 1979–1997. Journal of Public Economics, 85(1), 1-31.
[10] Cunningham, P., Gök, A., & Laredo, P. (2013). The impact of direct support to R&D and innovation in firms. Nesta Working Paper, 13/03.
[11] Czarnitzki, D., Hanel, P., & Rosa, J. M. (2011). Evaluating the impact of R&D tax credits on innovation: A microeconometric study on Canadian firms. Research Policy, 40(2), 217-229.
[12] David, P. A., Hall, B. H., & Toole, A. A. (2000). Is public R&D a complement or substitute for private R&D? A review of the econometric evidence. Research Policy, 29(4-5), 497-529.
[13] Dimos, C., & Pugh, G. (2016). The effectiveness of R&D subsidies: A meta-regression analysis of the evaluation literature. Research Policy, 45(4), 797-815.

[14] Hall, B. H., & Van Reenen, J. (2000). How effective are fiscal incentives for R&D? A review of the evidence. Research Policy, 29(4-5), 449-469.
[15] Hashim, M. K. (2011). SMEs in Malaysia: A brief handbook. August Publishing.
[16] Hussain, J., Millman, C., & Matlay, H. (2018). SME financing in the UK and in China: A comparative perspective. Journal of Small Business and Enterprise Development, 13(4), 584-599.
[17] Ismail, K., Khalid, S. A., Othman, A. R., & Jusoff, K. (2018). The role of business incubators in developing Malaysian SMEs. World Applied Sciences Journal, 10(8), 867-875.
[18] Ismail, M., Khalid, S. A., Othman, A. K., Jusoff, K., Abdul Karim, F. H., & Zain, R. S. (2015). Entrepreneurial orientation as a source of innovative behaviour in a developing country. Journal of Business Economics and Management, 16(1), 70-89.
[19] Karim, M. A., Ahmad, S. Z., & Zainal, S. R. M. (2008). The adoption of e-business amongst small and medium enterprises (SMEs) in Malaysia: Key issues and challenges. International Journal of Business and Management, 3(1), 96-111.
[20] Lerner, J. (2009). The empirical impact of intellectual property rights on innovation: Puzzles and clues. American Economic Review, 99(2), 343-348.
[21] Wonglimpiyarat, J. (2011). Government programmes in financing innovations: Comparative innovation system cases of Malaysia and Thailand. Technology in Society, 33(1-2), 156-164.
[22] Malaysia Digital Economy Corporation (MDEC). (2018). Annual Report. Available at: https://mdec.my/about-us/annual-reports/
[23] Malaysia Investment Development Authority (MIDA). (2019). Incentives for R&D and commercialization. Available at: https://www.mida.gov.my/home/incentives-for-r&d-and-commercialisation/posts/
[24] Malaysia Investment Development Authority (MIDA). (2020). Incentives for R&D and commercialization. Available at: https://www.mida.gov.my/home/incentives-for-r&d-and-commercialisation/posts/
[25] Mansfield, E. (1995). Academic research underlying industrial innovations: Sources, characteristics, and financing. The Review of Economics and Statistics, 77(1), 55-65.
[26] Mohamed, Z., Zain, D. M., & Muhamad, N. A. (2010). The effects of tax incentives on firm performance: Evidence from Malaysia. Asian Journal of Business and Accounting, 3(2), 33-52.
[27] Mohd Sani, N. A., Abdullah, M. Z., & Husin, N. H. (2018). The effectiveness of business incubators in developing entrepreneurial skills in Malaysia. Journal of Entrepreneurship and Business, 6(1), 16-24.
[28] Nor, N. M., Hamid, A. B. A., & Lada, S. (2011). Innovation barriers and enablers in Malaysian SMEs: An empirical analysis. International Journal of Business and Society, 12(2), 123-137.
[29] OECD. (2015). OECD Science, Technology and Industry Scoreboard 2015: Innovation for growth and society. OECD Publishing.
[30] Rasiah, R., & Chandran, V. G. R. (2009). University–industry R&D collaboration in the automotive, biotechnology and electronics firms in Malaysia. Seoul Journal of Economics, 22(4), 511-539.
[31] Ratinho, T., & Henriques, E. (2010). The role of science parks and business incubators in converging countries: Evidence from Portugal. Technovation, 30(4), 278-290.
[32] Saleh, A. S., & Ndubisi, N. O. (2006). An evaluation of SME development in Malaysia. International Review of Business Research Papers, 2(1), 1-14.
[33] Salman, A., & Arshad, D. (2016). The impact of business incubation on the performance of small and medium enterprises (SMEs). International Journal of Economics, Commerce and Management, 4(6), 310-320.
[34] Westmore, B. (2013). R&D, patenting and growth: The role of public policy. OECD Economics Department Working Papers, No. 1047. OECD Publishing.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 5: 195-206, 2024
DOI: 10.55214/25768484.v8i5.1681