COMPETITIVE ADVANTAGE OF SPORTSWEAR AND ACCESSORY BUSINESS IN THAILAND

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ABSTRACT

The study of the competitive advantage of the sports equipment business in Thailand reveals that creating a competitive advantage is crucial for market expansion and business success. Entrepreneurs who can manage and leverage their competitive advantages will be able to produce high-quality products, a key factor in attracting and retaining customers effectively. Additionally, possessing market power and building a positive image among customers are important for enhancing business competitiveness. In a highly competitive market, having good strategies for resource management, utilizing new technologies, and responding quickly to market demands will help the sports equipment business gain a competitive edge and achieve sustainable growth both domestically and internationally.

Keywords: Competitive, Advantage, Sportswear and Accessory, Business

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INTRODUCTION

The sports business encompasses both manufacturers and retailers, sports product factories, athletes, sports personnel, sports product and service markets, and sports sponsors, among others. The increasing global popularity of sports has resulted in a wide range of professionals and individuals involved in various aspects of sports, including players, organizers, referees, merchandise vendors, and millions of spectators (Kamolchanok Chumchai, 2018) Professional sports competitions are now popular and widespread worldwide, often referred to as the Global Sport phenomenon (Saranyu Yongpanich & Piyarath Rianpreecha, 2019) Which has spurred a health craze and increased interest in sports equipment. Moreover, the number of sports fans and those who enjoy playing sports has grown significantly.

In Thailand, sports competitions contribute to the growth trend of sportswear products. As sports competitions are becoming more professional, the domestic sports trend has become more dynamic, leading to increased interest in sportswear among sports fans and enthusiasts. Additionally, the health craze is a priority for Thais, supported by continuous campaigns and advertisements promoting exercise. This has driven demand for sportswear among healthconscious individuals and those who wish to exercise. The sportswear market is expected to grow further in the future, with designs becoming more fashionable and versatile, suitable for both sports and casual wear, increasing their usage frequency. Moreover, Thai sportswear manufacturers have expanded their customer base to include educational institutions, sports clubs, government agencies, and as sponsors in various sports competitions, leading to higher demand for sportswear (Bumrunpanictarworn et al., 2024). The sportswear market in Thailand can be categorized into three segments 1) High-end Market: Sportswear imported from abroad by leading brands, priced at approximately 1,000 baht and above. Consumers in this segment invest significantly and tend to choose premium brands. 2) Mid-range Market: Sportswear produced in Thailand or imitations of leading brands, priced between 300-1,000 baht. Consumers in this segment do not invest as heavily and consider price as a major factor. 3) Low-end Market: Sportswear produced in Thailand, including non-branded items and imitations of leading brands, priced below 300 baht. Consumers in this segment have income constraints and do not prioritize quality.

Competitive advantage in the sportswear business relies on several factors, particularly the ability to enhance production efficiency and product quality, which creates a positive image among customers. High-quality products that meet market demand help build market power, giving businesses a competitive edge. Producing goods that align with market needs also promotes a positive image and leads to business success. Sustainable production practices and achieving sustainability objectives are crucial factors in increasing competitive advantage. In conclusion, the success of a business stems from producing high-quality products that meet market demands and creating a positive image among customers, thereby increasing competitive advantage.

MEANING OF COMPETITIVE ADVANTAGE

Usa Churak and colleagues (2020) stated that competitive advantage refers to an organization's or business's ability to create value that surpasses competitors in the market. This can arise from various factors such as product and service quality, innovation, efficient management, effective use of resources, a good image, excellent customer service, and lower production costs.

Khalil et al. (2017) stated that competitive advantage helps organizations attract and retain customers better, offers higher profit opportunities, and enables long-term business stability and sustainability. For example, a company that can produce high-quality products at lower costs than competitors will have a competitive advantage because it can attract more customers and generate higher profits in the same market.

Megashah et al. (2018) mentioned that competitive advantage refers to a business's ability to do something better than its competitors, which can be categorized into two main types: cost advantage and differentiation advantage. Cost advantage is the ability to produce goods and services at lower costs than competitors, allowing for competitive pricing or higher profit margins. This can be achieved through technology that reduces production costs or sourcing cheaper raw materials. Differentiation advantage is the ability to offer unique products and services with distinct attributes or values that stand out from competitors, for which customers are willing to pay a higher price. Examples include innovative product development or building a strong brand image. Creating a competitive advantage requires good strategies and management, as well as continuous market and competitor analysis. This includes analyzing strengths and weaknesses to identify capabilities and limitations, investing in research and development to innovate and improve products, managing human resources to enhance employee skills and knowledge, and marketing and branding to build customer awareness and a positive image.

Bentivoglio et al. (2018) stated that the demand in the market arises from the fact that the products can be used in daily life and personal use in large quantities.

Yiin et al. (2018) mentioned that the competitiveness of a business is derived from the use of technology to reduce environmental impact, which enhances the company's reputation and gains customer trust.

Kushairi et al. (2017) indicated that business operations, which have continuously grown from upstream to downstream, result in high-quality products that are in demand and trusted by customers.

Dauvergne (2018) asserted that a business's ability to obtain standard certifications contributes to a positive image among customers.

Hutabarat et al. (2018) claimed that a business's competitiveness is achieved by creating a competitive advantage through a positive corporate image.

Carlson et al. (2018) pointed out that high-quality products can instill confidence in customers. Morgans et al. (2018) suggested that achieving business sustainability objectives is a pathway to success, contributing to the competitive advantage of the business.

Kadarusman and Herabadi (2018) stated that sustainable development within the business, encompassing both production processes and standards, can create a competitive advantage.

Therefore, competitive advantage is an organization's ability to create value that exceeds competitors in the market, which can result from various factors such as product and service quality, innovation, efficient management, effective use of resources, a good image, excellent customer service, and lower production costs. Competitive advantage can be categorized into two main types: cost advantage and differentiation advantage. Creating a competitive advantage requires good strategies and management, continuous market and competitor analysis, research and development, human resource management, and marketing and branding to ensure business sustainability and stay ahead of competitors in the long term.

THAILAND'S SPORTS INDUSTRY

As the COVID-19 situation eased in 2022, returning to normalcy, all sectors of the sports industry in Thailand were able to resume their operations as usual. Sports activities, exercise, sports competitions, and sports spectatorship were able to proceed without social distancing measures, leading to a resurgence in the value of the sports industry in Thailand, which is expected to continue growing in 2023.

The sports goods market is large and shows a trend of continuous growth. Currently, more and more people are placing importance on exercise and sports, as evidenced by the increasing number of sporting events, such as over 2,000 running events in 2022, with 14-15 million runners participating. Additionally, there is a growing trend in sport fashion, with people

increasingly buying sportswear and shoes for daily wear or work, contributing to a massive market for sports goods, including clothing, shoes, and sports equipment. The total market value is estimated at approximately 60 billion THB and is expected to grow to 70 billion THB in 2023, presenting an opportunity for Thai entrepreneurs.

Thailand's sports industry is expected to grow similarly to the global sports industry, following the recovery from the COVID-19 pandemic. The positive and negative factors affecting Thailand's sports industry can be summarized as follows.

Thailand's sports industry has experienced and capable entrepreneurs who can produce Thai sports brands that meet standards and are recognized. Notably, the "Big 4" brands—FBT, Grand Sport, Warrix, and Ari—had a combined revenue of 3,382.64 million THB in 2022. These brands also produce uniforms for 89 professional football teams in Thailand. Moreover, there are many small-scale producers of sports clothing and shoes in Thailand, with at least 112 small sportswear manufacturing companies registered with the Department of Business Development.

With COVID-19 being reclassified as an endemic disease, sports spectators were able to return to stadiums. This was evident in the case of Thai League matches, where the total number of spectators during the 2022/23 season was 1,063,098, or an average of 4,429 people per match, up from 528,165 people in the 2021/22 season. This increase in attendance led to higher revenues from ticket sales, food, beverages, and souvenirs, as well as positive effects on other businesses.

Although Thailand has several high-quality local sports brands, they are still not widely accepted or used by Thai consumers and sports teams in Thailand. It was found that the market share of the "Big 4" Thai brands—FBT, Grand Sport, Warrix, and Ari—accounted for only 5.64% of the total market value. Additionally, 35 Thai League football teams chose to produce their uniforms in-house without a brand, instead of purchasing from the aforementioned Thai brands. This reflects a problem with consumer acceptance.

Counterfeit sportswear and shoes, or in other words, pirated goods, pose a threat that hinders the growth of Thai sports brands. Despite ongoing crackdowns on counterfeit sports goods, they have not been entirely eliminated. A key reason is that many consumers prefer major brands like Nike, Adidas, Puma, and Reebok, which are significantly more expensive, leading them to opt for counterfeit products instead. These counterfeit products have very little difference in appearance but are much cheaper, making them more appealing than Thai brands, which are already more affordable.

Table 1 Structure of Thailand's Sports Industry

No.	Production Branch	Remarks
1	Agricultural products for	This sector includes the cultivation, breeding, and
	sports	propagation of other plants used in sports, such as football
		field grass, golf course grass, etc.
2	Livestock raising for sports	This sector includes the raising of animals used in sports, such as racehorses.
3	Production of beverages for athletes	This sector includes the production of electrolyte drinks and various beverages for athletes and exercisers.
4	Production of sportswear and sports shoes	This sector includes the production of sportswear and sports shoes.
5	Sports-related print media	This sector includes the production of newspapers, journals, and other printed media related to sports, both offline and online.
6	Production of medicines and pharmaceuticals for athletes	This sector includes the production of medicines and medical supplies for athletes, such as whey protein, sports massage cream, boxing liniment, sports tape, etc.

No.	Production Branch	Remarks
7	Production of vehicles for	This sector includes the production and repair of vehicles,
	sports	motorcycles, bicycles, and boats for sports.
8	Production of sports	This sector includes the production of sports equipment and
	equipment	various types of sports gear.
9	Construction of sports	This sector includes the construction, decoration, and
	stadiums	installation of electrical, plumbing, and utility systems for
		sports fields and fitness facilities, as well as accommodations
		within sports stadiums.
10	Wholesale/retail trade in	This sector includes the production of sportswear and sports
	sports-related goods	shoes.
11	Hotel, accommodation, and	This sector includes the provision of food and beverage
	restaurant services	services and accommodation services resulting from sports-
		related activities.
12	Travel and transportation	This sector includes transportation services by rail, all types
	services	of land transportation, coastal and waterway transportation,
		and air transportation resulting from sports-related activities.
13	Education and research	This sector includes education and research services related to
	services related to sports	sports, such as sports schools, educational institutions
		teaching physical education, sports science, sports
1.4	M. 1: -1 1-4-14-	management, sports-related research, and other related fields.
14	Medical services related to	This sector includes sports clinics, medical services,
15	sports Sports-related radio,	rehabilitation medicine, and physical therapy related to sports.
13	television, and digital media	This sector includes the production of sports-related programs broadcasted through various media such as radio, television,
	television, and digital media	digital media, and streaming services, including both free and
		subscription-based content.
16	Organizing sports	This sector includes activities of sports event organizers and
	competitions	producers, both with and without facilities.
17	Fitness and sports facility	This sector includes the operation of fitness facilities that
	services	provide the necessary amenities for health activities, such as
		exercise and sports education.
18	Sports clubs and	This sector includes the activities of sports clubs, sports
	associations	associations, and sports federations at the professional, semi-
		professional, or amateur levels, including providing
		opportunities for members to participate in sports activities.
19	Sports equipment repair	This sector includes the repair and maintenance of all types of
	services	sports equipment, except for boats, automobiles, motorcycles,
		and bicycles used in sports.
20	Other sports-related services	This sector includes the operation of facilities for indoor and
		outdoor sports competitions, the management and staffing of
		such facilities, and other sports-related activities not classified
		elsewhere.

From the table, it is observed that the sports industry in Thailand consists of various sectors of production and services, such as the production of agricultural products for sports, the raising of animals for competitions, and the production of beverages for athletes. Additionally, it includes the production of sportswear and sports shoes. This industry is a crucial part of supporting sports development and promoting sports participation in Thailand effectively, with its growth and diversity in the existing production and service sectors.

Table 2 Value of Output of Sports Industry Related Directly to Sports (Direct) for 2022

No.	IO	Production	Year 2022	Remarks
		Sector	(Thousand Baht)	
1	28	Agricultural	19,434.53	Calculate based on the proportion of revenue
		Products for Sports		from the sports facility construction category relative to the total revenue of the construction
		Sports		sector and the estimated revenue of individual
				entrepreneurs.
2	29	Animal	10,973.84	Calculate based on the total revenue of the
		Breeding for	,	businesses as filed with the DBD, as all are
		Sports		racehorse farms.
3	30	Production of	4,714,000.00	Calculate based on the total revenue of the
		Sports Drinks		businesses as filed with the DBD, as all are
				racehorse farms.
4	31	Production of	6,762,622.17	Calculate based on the total revenue of the
		Sports Apparel		businesses as filed with the DBD.
5	22	and Footwear	467.742.70	Calculate hazad an the narrows of maion
5	32	Sports Print Media	467,743.79	Calculate based on the revenue of major operators who are market leaders, including Siam
		Media		Sport Syndicate and Grand Pix International (in
				the print media sector).
6	33	Production of	1,596,112.15	Calculate based on the total revenue of major
		Sports Medicine	-,	sports medicine and pharmaceutical producers,
		and		such as Muay Oil, Counterpain, Tiger Palm, Pho
		Pharmaceutical		Yok, Tiger Plaster, etc.
		Products		
7	34	Production of	23,993,483.48	Calculate based on the total revenue of businesses
		Sports Vehicles		in the sports boat production sector and bicycle
				production as filed with the DBD, and the total
8	35	Production of	27,739,755.16	sales value of sport bikes. Calculate based on the total revenue of the
0	33	Sports	27,739,733.10	businesses as filed with the DBD.
		Equipment		ousinesses as fried with the DDD.
9	36	Construction of	1,081,638.60	Calculate based on the budget for constructing
		Sports Facilities	,	and maintaining sports facilities from the Sports
		-		Authority of Thailand, the Department of
				Physical Education, and the National Sports
				University.
10	37	Wholesale/Retai	63,775,882.10	Calculate based on the total revenue of businesses
		1 Sports		as filed with the DBD, where specific
				wholesale/retail sports activities are noted. For
				other wholesale/retail activities, use the revenue proportion from the sports industry according to
				the revenue of major retailers like Central Retail
				Group, combined with the estimated revenue of
				individual entrepreneurs.
11	38	Hotel,	70,786,982.02	Calculate based on the revenue from the sports
		Accommodation		industry according to the revenue proportion from
		, and Restaurant		research reports and the estimated revenue of
		Services		individual entrepreneurs.
12	39	Transportation	12,737,083.93	Calculate based on the revenue from the sports
		and Shipping		industry according to the revenue proportion from
		Services		research reports and the estimated revenue of
				individual entrepreneurs.

No.	IO Code	Production Sector	Year 2022 (Thousand Baht)	Remarks
13	40	Sports Education and Research Services	3,728.074.08	Calculate based on the total value of all sports- related courses in Thailand and the budget for sports education from the National Sports University.
14	41	Sports Medical Services	9,375,991.18	Calculate based on the revenue from the sports industry according to the proportion of sports medicine services in sports science.
15	42	Sports-Related Radio, Television, and Digital Media	1,095,441.87	Calculate based on the proportion of sports-related content from major sports television stations, such as MCOT and BEC, and the estimated revenue of popular sports YouTube channels, including "Kob Sanam," "Wata Luknang," "NRSport," and "Tua Thep Football."
16	43	Sports Event Organization	3,550,819.00	Calculate based on the total revenue of businesses as filed with the DBD.
17	44	Fitness and Sports Facility Services	6,292,614.88	Calculate based on the total revenue of businesses as filed with the DBD and the estimated sports-related revenue of individual entrepreneurs.
18	45	Sports Clubs and Associations	6,202,120.06	Calculate based on the total revenue of sports clubs and associations as filed with the DBD and the revenue of other sports associations that have also filed with the DBD.
19	46	Repair of Sports Equipment	63,553.74	Calculate based on the total revenue of businesses as filed with the DBD and the estimated revenue of individual entrepreneurs.
20	47	Other Sports- Related Services	20,320,801.07	Calculate based on the total revenue of businesses as filed with the DBD, the estimated revenue of individual entrepreneurs, and the sports service budget from the Sports Authority of Thailand and the Department of Physical Education, including construction, research, and sports association subsidies.
Tota	Total (thousand baht) 264,315,127.		264,315,127.65	

Source: Data was collected from a survey of entrepreneurs by the Economic Division, Office of the Permanent Secretary of the Ministry of Tourism and Sports, in conjunction with registration data from the Department of Business Development (DBD).

The value of the sports industry output directly related to sports (Direct) for the year 2022 was reported to be a total of 264,315,127.65 million Baht. Among the sectors, the highest value was in hotel accommodation and restaurant services, amounting to 70,786,982.02 million Baht. This was followed by wholesale/retail sports trading at 63,775,882.10 million Baht, and sports equipment production at 27,739,755.16 million Baht. These figures highlight the continuous growth of these businesses, which is a key reason why the researcher is interested in studying this topic.

Table 3 Value of Sports Industry Output in Thailand (2019-2022)

Na	Ю	Production Sector	Product value (thousand baht)				
	Code		2019	2020	2021	2022	
1	28	Agricultural Products for Sports	19.032.37	17,540.09	17.277.27	19,434.53	
2	29	Animal Breeding for Sports	20,627.80	10,020.53	7,260.27	10,973.84	
3	30	Production of Sports Drinks	5,500,000.00	5,225,000.00	4,962,105.26	4,714,000.00	
4	31	Production of Sports Apparel and Footwear	4,221,600.33	3,603,206.46	4,990,966.04	6,762,622.17	
5	32	Sports Print Media	516,375.93	413,570.18	427,585.87	467,743.79	
6	33	Production of Sports Medicine and Pharmaceutical Products	1,200,000.00	1,230,689.59	1,232,929.76	1,596,112.15	
7	34	Production of Sports Vehicles	25,465,899.69	22,307,983.71	26,281,684.36	23,993,483.48	
8	35	Production of Sports Equipment	20,828,128.17	18,671,363.61	23,104,406.52	27,739,755.16	
9	36	Construction of Sports Facilities	671,317.40	600.227.30	614,689.50	1,081.638.60	
10	37	Wholesale/Retail Sports	63,777,756.58	53,402,086.89	53,295,995.76	63,775,882.10	
11	38	Hotel, Accommodation, and Restaurant Services	86,520,552.05	51,532,838.81	43,806,839.47	70,786,982.02	
12	39	Transportation and Shipping Services	23,751,173.98	9,752,106.04	7,630,600.19	12,737,083.93	
13	40	Sports Education and Research Services	4,101,747.51	3,868,762.20	3,733,592.42	3,728,074.08	
14	41	Sports Medical Services	7,417,920.96	6,401,087.86	7,985,200.44	9,375,991.18	
15	42	Sports-Related Radio, Television, and Digital Media	1,056,460.80	920,900.65	1,034,964.33	1,095,441.87	
16	43	Sports Event Organization	3,446,758.08	1,472,660.34	1,218,563.47	3,550,819.00	
17	44	Fitness and Sports Facility Services	10,016,857.09	7,196,821.03	5,405,436.59	6,292,614.88	
18	45	Sports Clubs and Associations	8,898,004.15	4,918,486.62	5,104,614.69	6,202,120.06	
19	46	Repair of Sports Equipment	33,803.78	14,997.89	12,182.42	63,553.74	
20	47	Other Sports- Related Services	14,336.808.75	13.243.523.25	20.320.801.07	19,727,598.02	
Total (thousand baht) 287,191,614,70 205,897,158.54 204,110,417.89 264,315,127.65							

Source: Data derived from the survey of operators conducted by the Tourism and Sports Economic Division, Office of the Permanent Secretary of the Ministry of Tourism and Sports, in conjunction with registration data from the Department of Business Development (DBD), showing the value of sports industry output for the years 2019-2022.

From the table, it is observed that the value of sports industry output decreased during 2020-2021 due to the COVID-19 situation. As the situation improved and returned to normal, businesses across all sectors of the sports industry were able to resume operations. By 2022, the value of output in the sports industry showed recovery, with the highest value recorded in the "Hotel, Accommodation, and Restaurant Services" sector, followed by "Wholesale/Retail Sports Trade." Additionally, the sectors related to the production of sportswear and equipment also showed significant values. Overall, the sports industry in Thailand has experienced renewed growth and is expected to continue expanding.

CONCLUSION

Competitive advantage is a crucial factor contributing to the success of the sports equipment business in Thailand. In a highly competitive market, both domestically and internationally, the ability to differentiate and surpass competitors is key to market expansion and business sustainability. High-quality products that meet market demands will help create a positive image and attract more customers. Additionally, incorporating innovation in production, managing resources efficiently, and implementing appropriate strategies will help businesses reduce production costs and increase operational efficiency. These elements will strengthen competitive advantage in the long term. Sports equipment businesses that can adapt and respond well to market changes will have the opportunity to grow and achieve sustainable success in this industry.

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From synthesizing the importance and benefits of competitive advantage for the sports equipment business in Thailand, it was found that competitive advantages in various aspects help build stability and success for the sports equipment business in Thailand, which is essential. Entrepreneurs must have the skills to manage their businesses with the following components.

- 1) Product Quality: Product quality is a key factor in establishing a competitive advantage for sportswear and accessory businesses in Thailand. Producing high-quality products not only meets market demands but also builds customer satisfaction and trust, leading to repeat purchases and brand loyalty. Success in product quality enables businesses to compete in a rapidly growing and highly competitive market. Establishing clear quality standards, utilizing technology and innovation in production, and implementing strict quality control measures are essential in maintaining high product quality.
- 2) Market Power: Market power refers to a business's ability to dominate a significant market share and create an advantage through effective management. Building a strong brand, executing targeted marketing plans, and accurately penetrating target markets help businesses set prices, expand their customer base, and form strategic partnerships. Creating market power also involves understanding and adapting to market trends, such as responding to health trends, changes in consumer preferences regarding sports fashion, and tapping into new potential customer segments.
- 3) Positive Brand Image: A positive brand image in the eyes of customers has a long-term impact on a business's success. A good image fosters customer trust, loyalty, and acceptance, leading to business growth. This image may stem from product quality, excellent service, involvement in socially valuable activities, or sustainable business practices. Investing in brand image, such as through marketing, communication, product design, and supporting sports events, enhances brand recognition and builds consumer trust.

REFERENCES

- Bentivoglio, D., Finco, A., & Bucci, G. (2018). Factors affecting the indonesian palm oil market in food and fuel industry: Evidence from a time series analysis. *International Journal of Energy Economics and Policy*, 8(5), 49-57.
- Bumrunpanictarworn, A., To-aj, O., Chanbanchong, N., & Suksuwan, C. (2024). Entrepreneurship Education in Market Entry Mode Strategies: Case Study of Thai Sports Apparel Company Entering Indonesia's Market. *Kurdish Studies, 12*(1), 4078-4090.
- Dauvergne, P. (2018). The global politics of the business of "sustainable" palm oil. *Global Environmental Politics*, 18(2), 34-52.
- Department of Business Development. (2024). *Retail Sales of Sporting Goods in Specialty* Stores. Retrieved from https://datawarehouse.dbd.go.th/searchBusinessObject? type=business.
- Hutabarat, S., Slingerland, M., Rietberg, P., & Dries, L. (2018). Costs and benefits of certification of independent oil palm smallholders in Indonesia. *International Food and Agribusiness Management Review*, 21(6), 681-700.
- Kadarusman, Y. B., & Herabadi, A. G. (2018). Improving sustainable development within Indonesian palm oil: the importance of the reward system. *Sustainable Development*, 26(4), 422-434.
- Kamolchanok Chumchoei. (2018). Factors of Motivation in Watching Football Matches. Bangkok: Chulalongkorn University.
- Khalil, I., Aziz, A. R. A., Yusup, S., Heikal, M., & El-Adawy, M. (2017). Response surface methodology for the optimization of the production of rubber seed/palm oil biodiesel, IDI diesel engine performance, and emissions. *Biomass Conversion and Biorefinery*, 7, 37-49.
- Kushairi, A., Singh, R., & Ong-Abdullah, M. (2017). The oil palm industry in Malaysia: Thriving with transformative technologies. *Journal of Oil Palm Research*, 29(4), 431-439.
- Megashah, L. N., Ariffin, H., Zakaria, M. R., & Hassan, M. A. (2018, June). Properties of cellulose extract from different types of oil palm biomass. In *IOP Conference Series: Materials Science and Engineering* (Vol. 368, p. 012049). IOP Publishing.
- Morgans, C. L., Meijaard, E., Santika, T., Law, E., Budiharta, S., Ancrenaz, M., & Wilson, K. A. (2018). Evaluating the effectiveness of palm oil certification in delivering multiple sustainability objectives. *Environmental Research Letters*, 13(6), 064032.
- Saranyu Yongpanich & Piyarat Rianpricha. (2019). *Management of Professional Football Teams: A Case Study of Chonburi Club*. Bangkok: Bangkok Thonburi University.
- Usa Churak & Colleagues. (2020). Testing Hybrid Oil Palm Varieties with High Yield Potential from the 2nd Improvement Project in Krabi Province. Retrieved from https://www.doa.go.th/.
- Yiin, J. H., Anderson, J. L., Bertke, S. J., & Tollerud, D. J. (2018). Dose-response relationships between internally-deposited uranium and select health outcomes in gaseous diffusion plant workers, 1948-2011. *American journal of industrial medicine*, 61(7), 605-614.

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