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The Influence of Sports Mega-Events on Local Business Growth: A Study of PON 2024 Aquatic Venue

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ABSTRACT

Purpose of the study: Sports mega-events have emerged as significant catalysts for regional economic development, yet their impact on local business ecosystems remains inadequately understood, particularly in developing economies. The Pekan Olahraga Nasional (PON) 2024, hosted in Papua, Indonesia, presents a unique opportunity to examine these dynamics within an emerging market context. This research investigates the influence of PON 2024's aquatic venue on local business growth, examining both immediate and sustained economic impacts on small and medium enterprises (SMEs) in the host region.

Materials and methods: A mixed-methods approach was employed, involving 387 local businesses across hospitality, retail, transportation, and service sectors. Data collection occurred through structured surveys, financial performance analysis, and semi-structured interviews conducted pre-event (6 months prior), during the event, and post-event (6 months after). Quantitative analyses were conducted using SPSS v27, employing descriptive statistics, paired t-tests, and multiple regression analysis.

Results: Local businesses experienced a mean revenue increase of 34.7% (SD = 12.3) during the event period compared to baseline measurements. The hospitality sector demonstrated the highest growth (47.2%), followed by retail (31.8%) and transportation services (28.4%). Post-event analysis revealed sustained growth of 18.3% above baseline levels six months after conclusion. Employment increased by 23.1% during the event, with 67.4% of new positions retained post-event.

Conclusions: PON 2024's aquatic venue generated substantial positive impacts on local business growth, with effects extending beyond the immediate event period. The findings suggest that well-planned sports mega-events can serve as effective tools for regional economic development, particularly when integrated with comprehensive local business development strategies.

Keywords
sports mega-events, local business growth, economic impact, PON 2024, aquatic venue, regional development, Indonesia.

INTRODUCTION

Contextual Framework of the Research

Sports mega-events have increasingly been recognized as powerful instruments for economic development, urban transformation, destination promotion, and infrastructure modernization (Revindo et al., 2025; Widianingsih et al., 2023). Although the term “mega-event” is commonly associated with international competitions such as the Olympic Games and FIFA World Cup, national-scale events can also generate substantial economic consequences when they attract large numbers of athletes, officials, spectators, media personnel, sponsors, and service providers (Schulenkorf & Schlenker, 2017, p. 218; Sterken, 2006, p. 378). These events create temporary increases in demand for accommodation, food and beverages, transportation, retail products, recreation, and various professional services. They may also stimulate longer-term changes in investment, employment, business capacity, and the image of the host region.

The Pekan Olahraga Nasional 2024, Indonesia’s premier national multi-sport competition, represents a significant investment in sporting infrastructure and regional development(Lee & Krohn, 2013, p. 363; Raso & Cherubini, 2023, p. 115). Hosted in Papua Province, the event marked the first time PON was held in Indonesia’s easternmost region, creating unprecedented opportunities for local economic stimulation and regional visibility. The event brought together participants and visitors from different parts of Indonesia, thereby increasing the movement of people, money, information, and commercial activity within the host area. In this context, PON 2024 can be understood not only as a sporting competition but also as a temporary regional economic intervention capable of influencing consumption patterns, business activity, employment, and perceptions of Papua as a destination for tourism and investment (Guntoro et al., 2023, p. 164; Ohee et al., 2025)

The economic influence of a sports event generally operates through several interconnected channels. The first is the direct expenditure generated by visitors and event participants. Spending on hotels, restaurants, transportation, shopping, entertainment, and local services can immediately increase sales and revenue for businesses located near the event venue. The second channel is the indirect effect created when event-related businesses purchase additional goods and services from local suppliers. For example, hotels may increase their purchases of food, cleaning materials, laundry services, maintenance, and transportation. Restaurants may procure more products from local farmers, fishermen, wholesalers, and distributors. The third channel is the induced effect, which occurs when workers and business owners spend their additional income within the local economy. These interactions may produce a multiplier effect, although the size of the multiplier depends on the degree to which expenditure remains within the region rather than flowing to external suppliers or corporations (Sterken, 2006).

Infrastructure development constitutes another important mechanism linking sports events to local business growth. The construction or renovation of aquatic venues, roads, accommodation facilities, public spaces, communication systems, and transportation networks can improve the operating environment for existing businesses (Hayduk & Rewilak, 2021, p. 124; Lee & Krohn, 2013, p. 363). Better infrastructure may reduce travel time, improve accessibility, increase visitor convenience, and enhance the attractiveness of the surrounding area to consumers and investors. Sporting facilities may also function as anchors for broader commercial development by creating concentrated flows of visitors and encouraging the establishment of restaurants, retail outlets, accommodation providers, recreational services, and other complementary businesses. Nevertheless, the economic value of infrastructure depends on its post-event utilization, maintenance, accessibility to local communities, and integration with wider regional development plans (Gratton et al., 2005; Sterken, 2006).

The aquatic venue constructed for PON 2024 serves as a focal point for examining the relationship between sports infrastructure development and local business ecosystems (Zhao & Gao, 2025, p. 4). Unlike a temporary event space, an aquatic venue may support multiple activities beyond the competition itself, including community swimming programs, athlete training, educational initiatives, local competitions, recreational activities, tourism programs, and future sporting events (Shao et al., 2023). These potential uses create opportunities for continuous business interaction between the venue and surrounding enterprises. Hospitality businesses may benefit from visiting teams and spectators, transportation providers may serve athletes and visitors, retail businesses may respond to increased consumer traffic, and service enterprises may provide equipment, catering, security, cleaning, maintenance, and event-support services.

The venue can therefore be viewed as an economic node rather than an isolated sporting structure. Its influence may extend beyond the physical boundaries of the facility through networks of suppliers, employees, contractors, visitors, and consumers(Kim et al., 2021, p. 569; Lee & Krohn, 2013, p. 363). This perspective is particularly relevant for examining small and medium enterprises, which often have limited financial resources but can respond quickly to short-term changes in demand. SMEs may benefit from event-related opportunities by expanding operating hours, increasing inventories, developing new products, hiring temporary workers, forming partnerships, or supplying goods and services to event organizers. However, their ability to benefit may be constrained by limited access to capital, inadequate managerial capacity, insufficient information about procurement opportunities, weak digital marketing capabilities, and competition from larger firms or external suppliers (Kiemtoré et al., 2022, p. 552; Maitimu et al., 2025, p. 547). Research indicates that micro and small businesses may be recognized as important beneficiaries of mega-events while simultaneously being excluded from planning, procurement, trading spaces, and long-term legacy opportunities (Kirby et al., 2018).

Papua's unique geographical position and emerging economic status provide a distinctive context for understanding how sports mega-events influence business growth in developing regions. The region's geographic distance from Indonesia's major commercial centers, transportation limitations, relatively small formal business base, and uneven infrastructure development may affect the way event-related economic benefits are distributed. These conditions can increase the importance of local suppliers and service providers because event organizers and visitors require goods and services within the host area. At the same time, they may also increase costs, create supply shortages, limit the availability of accommodation, and encourage the importation of goods and services from outside Papua. Consequently, the economic impact of PON 2024 cannot be assessed solely by measuring the total amount of money associated with the event; it must also consider the proportion of expenditure captured by local businesses and the extent to which benefits circulate within the regional economy.

The event's effect on local businesses is also likely to vary across sectors. Hospitality businesses may experience increased room occupancy, food and beverage sales, and demand for event-related accommodation. Retail businesses may benefit from higher demand for groceries, sporting goods, souvenirs, clothing, personal necessities, and locally produced products (Pedauga et al., 2020, p. 610; Revindo et al., 2023, p. 252). Transportation providers may gain from increased passenger movement between airports, hotels, venues, and tourist destinations. Service-sector enterprises may receive opportunities in catering, logistics, security, cleaning, equipment rental, communication, information technology, and event management. These sectoral differences suggest that an aggregate measure of economic impact may conceal important variations in the magnitude, timing, and sustainability of business benefit (Dwyer et al., 2006; Matheson & Baade, 2004, p. 1098).

In addition to direct commercial effects, PON 2024 may influence local business growth through destination visibility and reputation. Media coverage, visitor experiences, and the successful operation of the aquatic venue may strengthen Papua's image as a capable host region and a potential destination for future sporting, tourism, cultural, and business activities. Improved regional visibility can encourage repeat visits, attract future events, stimulate investment, and expand market access for local enterprises. However, reputational benefits are not automatic. They depend on the quality of event management, visitor satisfaction, accessibility, safety, environmental responsibility, and the capacity of local businesses to convert temporary exposure into sustained commercial relationships.

The temporal dimension is central to understanding the influence of PON 2024 on local business growth. During the preparation phase, businesses may experience increased demand for construction materials, accommodation, food services, transportation, labor, and event-related supplies. During the event period, demand may rise sharply because of the concentration of visitors and participants. After the event, however, demand may decline if the venue is underutilized, visitor flows return to normal, or temporary employment and procurement contracts end. A comprehensive assessment must therefore distinguish between short-term event effects and longer-term outcomes. Long-term benefits may include improved infrastructure, stronger business networks, enhanced workforce skills, increased destination recognition, and continued use of the aquatic venue. Conversely, potential risks include declining revenue, underutilized facilities, increased operating costs, debt burdens, displacement of existing businesses, and unequal access to event-related opportunities (Knott & Tınaz, 2022; Thabi, 2024).

The local business ecosystem provides an appropriate analytical lens because businesses do not operate independently. Their performance is shaped by relationships with suppliers, customers, workers, government agencies, event organizers, financial institutions, tourism operators, and other firms. PON 2024 may strengthen these relationships by encouraging cooperation, joint marketing, local procurement, and the exchange of knowledge. It may also expose weaknesses in the local business system, including limited supplier capacity, inadequate coordination, restricted access to finance, and a lack of strategic planning. Examining these relationships makes it possible to determine whether the event generated broad-based local development or primarily produced temporary gains for a limited number of businesses.

This study consequently conceptualizes the aquatic venue as an intervention that may influence local business growth through direct expenditure, infrastructure improvement, employment generation, supplier linkages, destination promotion, and the development of business capabilities. Local business growth is examined through indicators such as revenue, employment, customer volume, business expansion, investment, operating capacity, and the retention of event-related opportunities after the competition. The framework also recognizes that the magnitude of these effects may be influenced by business sector, firm size, proximity to the venue, access to event information, participation in procurement networks, managerial capacity, and the extent of government and stakeholder support.

By focusing on PON 2024's aquatic venue, the research addresses the need to examine the economic consequences of a national sporting event in an emerging regional context. It moves beyond a narrow assessment of visitor spending by investigating how event-related activity is transmitted through local businesses and how temporary economic stimulation may develop into sustained business growth. The framework therefore connects sports infrastructure, event expenditure, local business participation, employment, regional economic circulation, and post-event legacy within a single analytical perspective. This approach provides a basis for evaluating whether PON 2024 functioned merely as a short-term demand shock or as a catalyst for broader and more durable economic development in Papua.

Critical Examination of Existing Literature

Previous research on the economic impacts of sports events has predominantly focused on major international competitions, particularly the Olympic Games and the FIFA World Cup (Baade & Matheson, 2016; Zimbalist, 2015). These studies have examined how sporting events influence host economies through visitor expenditure, infrastructure investment, employment generation, destination promotion, business development, and public-sector spending. However, the findings remain mixed. Some researchers identify positive effects, including increased tourism activity, temporary employment, improved infrastructure, and enhanced destination visibility (Dwyer et al., 2005; Li & Blake, 2009). Other studies argue that the anticipated benefits are frequently overstated because they may be offset by public subsidies, cost overruns, imported labor, profit repatriation, displacement of existing economic activity, and the underutilization of event facilities after the competition (Coates & Humphreys, 2008; Peeters et al., 2014). Consequently, hosting a sporting event does not automatically produce broad-based or long-term economic development.

The literature identifies several mechanisms through which sports events can influence local economies. Tourism expenditure is one of the most frequently discussed mechanisms. Visitors, athletes, officials, media representatives, and event personnel generate demand for accommodation, food and beverages, transportation, retail goods, recreational activities, and other visitor services (Gibson et al., 2011). This demand may increase business revenue directly, particularly during the event period when the concentration of consumers is substantially higher than under normal market conditions. The benefits may also extend to upstream suppliers when hotels, restaurants, retailers, transport operators, and event organizers purchase additional goods and services from local producers and distributors. In this way, event expenditure may create indirect and induced effects throughout the regional economy.

Nevertheless, the size of these multiplier effects depends on the degree to which expenditure remains within the host economy. Economic leakages may occur when businesses purchase supplies from outside the region, when workers are recruited from other areas, or when profits are transferred to external owners. The local economic contribution of an event may therefore be considerably smaller than the total amount of money spent by visitors and organizers. A proper assessment must distinguish between gross expenditure and net local economic impact by considering displacement, substitution, opportunity costs, and the movement of income into and out of the host region (Dwyer et al., 2006; Matheson & Baade, 2004, p. 1098). This issue is particularly important in emerging regions, where local production capacity and supplier networks may be limited.

Infrastructure development represents another important mechanism. Event preparation may lead to the construction or improvement of aquatic venues, roads, public transportation systems, accommodation facilities, utilities, communication networks, and public amenities. Such investments can reduce transportation costs, improve accessibility, increase the attractiveness of the destination, and strengthen the operating capacity of local businesses (Gratton et al., 2005). Improved infrastructure may also create opportunities for future sporting, tourism, cultural, and business activities. In the case of an aquatic venue, the facility may support swimming competitions, training programs, recreational activities, educational programs, community events, and tourism-related services after PON 2024.

However, infrastructure investment can produce positive outcomes only when it is aligned with local demand and supported by a credible post-event management strategy. Facilities that are expensive to operate, poorly connected to local communities, or used only for occasional competitions may generate limited economic value after the event. Maintenance costs, staffing requirements, security expenses, and debt obligations may place pressure on public budgets and reduce the net benefits available to the local economy. The long-term contribution of infrastructure therefore depends not only on its construction but also on its utilization, accessibility, financial sustainability, and integration into regional development planning (Preuß, 2007; Thabi, 2024).

Employment generation is also widely identified as an economic benefit of sports events. Event preparation may create jobs in construction, engineering, facility management, transportation, hospitality, security, catering, cleaning, logistics, and administration. During the competition, additional workers may be needed to manage visitors, operate the venue, provide food and accommodation services, and support event logistics. These employment effects may increase household income and stimulate additional consumption within the local economy. Previous research also indicates that sport events can contribute to employment across hospitality, tourism, transportation, and construction sectors (Raso & Cherubini, 2023, p. 115).

The employment effects should nevertheless be examined in terms of their duration, quality, and accessibility. Many event-related positions are temporary, seasonal, or informal, and may end once the event has concluded. The benefits may also be distributed unevenly if local residents do not possess the skills required for specialized positions. In addition, the employment figures reported by event organizers may include jobs that would have existed in the local economy even without the event. Therefore, an evaluation should distinguish between newly created employment, temporary employment, transferred employment, and retained employment. Attention should also be given to wages, working conditions, training opportunities, and the proportion of positions occupied by local workers.

The "festival effect" provides a further explanation of the short-term economic influence of sports events. The arrival of large numbers of visitors and the concentration of activities within a limited period can create an intense increase in consumption and business transactions (Crompton, 2002). Local enterprises may benefit from increased customer volume, extended operating hours, higher occupancy rates, and greater visibility. Small businesses may also use the event to test new products, develop partnerships, improve their marketing, and establish relationships with visitors and event-related organizations. However, this effect is typically concentrated in specific locations and periods. Businesses close to the venue or along major visitor routes may receive greater benefits than enterprises located in less accessible areas.

The distribution of benefits across sectors is another important issue that remains insufficiently explored. Hospitality businesses may benefit from increased accommodation demand, while food and beverage enterprises may experience higher sales from visitors, athletes, and officials. Retail businesses may receive additional demand for groceries, sporting goods, souvenirs, clothing, and personal necessities. Transportation providers may gain from passenger movement between airports, hotels, the aquatic venue, and other tourist destinations. Service-sector enterprises may obtain opportunities in catering, security, cleaning, equipment rental, information technology, communications, and event management. These sectoral effects are unlikely to be uniform because they depend on consumer preferences, procurement arrangements, business capacity, and the timing of event activities (Gibson et al., 2011; Pedauga et al., 2020, p. 610).

The literature also emphasizes the importance of destination image and promotional effects. Media exposure, visitor experiences, and successful event delivery may improve the reputation of the host region and increase awareness among potential tourists, investors, government agencies, and future event organizers. Positive destination branding may encourage repeat visits, stimulate future tourism, attract additional events, and expand market access for local enterprises (Knott & Tınaz, 2022, p. 926335; Thabi, 2024). These benefits are often described as intangible legacies because they may not be immediately reflected in business revenue or employment statistics. Their economic value may emerge gradually through changes in visitor perceptions, investment decisions, business networks, and regional competitiveness.

Destination-related benefits are not automatic, however. Negative media coverage, poor event organization, inadequate transportation, safety problems, environmental damage, or low visitor satisfaction may weaken the host region's reputation. In addition, increased visibility may benefit external businesses more than local enterprises if local firms lack the marketing capacity, product quality, financial resources, or institutional support required to convert exposure into continuing commercial relationships. The literature therefore suggests that destination promotion must be accompanied by local business development, stakeholder coordination, and post-event tourism strategies.

A further limitation concerns the temporal scope of existing research. Many studies concentrate on the pre-event and event periods, when public expenditure and visitor demand are at their highest. This approach may capture immediate changes in sales, employment, and business activity but may fail to determine whether these changes continue after the event. The concept of sport-event legacy requires attention to the persistence, distribution, and transformation of event-related outcomes over time (Preuß, 2007). Long-term benefits may include improved infrastructure, stronger business networks, enhanced workforce skills, increased destination recognition, and continued use of event facilities. Conversely, possible negative legacies include declining revenue, underutilized venues, increased operating costs, public debt, business displacement, and unequal access to event-related opportunities (Knott & Tınaz, 2022, p. 926335; Thabi, 2024).

The distinction between ex ante and ex post assessment is also significant. Ex ante studies are generally conducted before an event and often estimate potential benefits based on projected visitor numbers, spending patterns, investment levels, and multiplier effects. Such estimates may be useful for planning but can exaggerate benefits when they do not adequately account for substitution, displacement, leakages, and opportunity costs (Barrios et al., 2016; Matheson, 2006). Ex post studies, by contrast, evaluate outcomes after the event using observed data. They provide a more reliable basis for determining whether projected benefits actually occurred, which sectors benefited, and whether public investments generated sufficient economic returns. A comprehensive evaluation of PON 2024 should therefore combine baseline information with measurements taken during and after the event.

Small and medium-sized enterprises represent an especially important but underexplored dimension of the literature. Although local businesses are frequently presented as major beneficiaries of sporting events, micro and small enterprises may face difficulties accessing procurement contracts, event information, financing, formal registration systems, and business networks. They may also be disadvantaged by competition from larger companies, chain businesses, and external suppliers. Existing research indicates that micro and small businesses can be sidelined during the planning, delivery, and legacy phases of major sporting events, despite being used to justify the local development benefits of hosting such events (Kirby et al., 2018). This limitation is particularly relevant to Papua, where the capacity of local firms to participate in event-related markets may vary considerably by sector, location, ownership, and enterprise size.

The literature further suggests that the impacts of sporting events should be understood as uneven and relational rather than automatic and uniform. Businesses do not operate independently; they are connected through supplier relationships, labor markets, customer networks, public institutions, financial organizations, tourism operators, and event-management structures. The ability of a business to benefit from an event may depend on its proximity to the venue, access to information, managerial capacity, financial resources, quality standards, digital marketing capabilities, and relationships with government agencies and event organizers. Consequently, aggregate measures of economic impact may conceal important differences between sectors, enterprise sizes, and geographic locations.

Methodologically, previous studies have used input-output models, multiplier analysis, computable general equilibrium models, surveys, case studies, interviews, and comparative assessments. Each method provides different insights but also has limitations. Input-output and multiplier models can estimate intersectoral effects but may overstate benefits when they assume fixed relationships, ignore supply constraints, or inadequately measure leakages. Computable general equilibrium models can account for broader regional and national adjustments, displacement, fiscal effects, and interindustry changes but require extensive data and assumptions (Dwyer et al., 2006). Surveys and interviews can capture business perceptions, adaptive strategies, and experiences that are not visible in macroeconomic statistics, although they may be affected by recall bias, response bias, and difficulties in verifying financial information. A mixed analytical approach is therefore more appropriate for examining the complex relationship between PON 2024 and local business growth.

Overall, the existing literature provides a useful foundation for understanding the economic effects of sporting events, but several limitations remain. Research has concentrated heavily on international mega-events, developed economies, and short-term economic indicators. Less attention has been given to national or regional sporting events, aquatic venues, local business ecosystems, small and medium-sized enterprises, and the continuation of economic effects after the event. The literature also provides limited explanation of how event expenditure is transmitted through particular sectors and how local enterprises convert temporary demand into sustained business growth.

These limitations establish the need for a context-sensitive investigation of PON 2024's aquatic venue in Papua. The present study responds to the gaps by examining direct, indirect, and longer-term effects on local businesses; comparing outcomes across sectors and enterprise sizes; analyzing changes during the preparation, event, and post-event periods; and identifying the conditions that support or constrain the retention of event-related benefits. By combining business-level indicators with an analysis of local linkages and post-event outcomes, the study seeks to determine whether PON 2024 generated only a temporary increase in economic activity or contributed to more durable local business development.

Identification of Research Gaps

A comprehensive review of existing literature reveals several critical gaps in understanding the relationship between sports mega-events and local business development. First, there is limited research examining the impacts of regional or national-level sporting events, with the majority of studies focusing on international competitions that may not reflect the dynamics of domestically-oriented events (Taks et al., 2011). Second, the specific mechanisms through which sports infrastructure influences different business sectors remain poorly understood, particularly in the context of aquatic venues (Kavetsos & Szymanski, 2009). Third, the sustainability of economic impacts beyond the immediate post-event period requires more comprehensive investigation, particularly regarding employment generation and business capacity building (Preuß, 2007).

Additionally, the literature lacks sufficient attention to the unique challenges and opportunities present in developing economies, where local business ecosystems may respond differently to mega-event stimuli compared to established markets (Cornelissen et al., 2011). The interaction between event-driven economic activity and existing local business networks requires more detailed examination to understand how mega-events can be leveraged for sustainable regional development.

Rationale for the Research

The selection of PON 2024's aquatic venue as a research focus is justified by several factors. First, aquatic venues represent significant infrastructure investments that often serve multiple community functions beyond sporting events, potentially generating sustained economic benefits (Gratton et al., 2005). Second, Papua's status as an emerging economic region provides insights into how sports mega-events can contribute to regional development strategies in developing contexts. Third, the domestic nature of PON allows for examination of event impacts without the confounding effects of international tourism patterns that characterize global mega-events.

Understanding the relationship between PON 2024 and local business growth has important implications for policy development and event management strategies. As Indonesia continues to invest in sporting infrastructure and pursue hosting opportunities for major events, evidence-based insights into the economic impacts of such investments become crucial for informed decision-making (Raso & Cherubini, 2023, p. 115; Thabi, 2024).

Objectives

This research aims to comprehensively examine the multifaceted economic impacts of PON 2024's aquatic venue on the local business ecosystem through a series of interconnected analytical objectives. The primary focus centers on quantifying the impact of the aquatic venue on local business revenue and employment across different sectors, providing empirical evidence for the magnitude and distribution of economic effects. Building upon this foundation, the study seeks to analyze the temporal patterns of economic impact, encompassing pre-event preparation phases, event execution periods, and post-event sustainability phases to understand the dynamic nature of mega-event influences. Additionally, the research aims to identify the specific mechanisms through which the aquatic venue influences local business performance, examining both direct and indirect pathways of economic stimulation. The investigation extends to assess the differential impacts across various business sectors and enterprise sizes, recognizing that economic benefits may not be uniformly distributed across the local business landscape. Furthermore, the study evaluates the long-term sustainability of economic benefits generated by the event, addressing critical questions about the durability of mega-event impacts beyond immediate implementation periods. Finally, the research seeks to provide evidence-based recommendations for maximizing the economic benefits of future sports mega-events in developing regions, contributing to policy development and strategic planning for sustainable regional development through sporting infrastructure investments.

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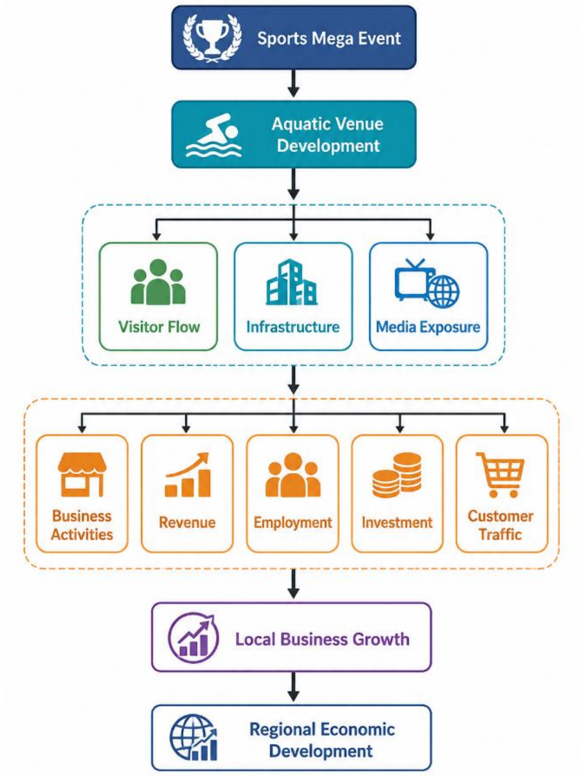

Figure 1. Conceptual Framework

MATERIALS AND METHODS

The study population comprised local businesses operating within a 25-kilometer radius of the PON 2024 aquatic venue in Jayapura, Papua Province. A stratified random sampling approach was employed to ensure representative coverage across different business sectors and enterprise sizes. The final sample consisted of 387 businesses distributed as follows: hospitality sector (n=94, 24.3%), retail sector (n=121, 31.3%), transportation services (n=78, 20.2%), food and beverage services (n=67, 17.3%), and other services (n=27, 7.0%).

Inclusion criteria required businesses to have been operational for a minimum of 12 months prior to PON 2024 commencement and to maintain complete financial records for the study period. Exclusion criteria eliminated businesses with primary operations outside the designated geographic area and those unable to provide verifiable financial data. The sample size was determined using power analysis ($\alpha = 0.05$, $\beta = 0.80$) based on expected effect sizes derived from preliminary data and similar studies in the literature.

Figure 2. Timeline of the Research

Study Organization

The research employed a longitudinal quasi-experimental design with repeated measures across three distinct temporal phases: pre-event (6 months prior to PON 2024), event period (during PON 2024 execution), and post-event (6 months following event conclusion). This design allowed for the examination of both immediate and sustained impacts while controlling for seasonal variations and other temporal confounding factors.

Data collection was conducted through multiple channels to ensure comprehensive coverage and methodological triangulation. Primary data sources included structured business surveys, financial performance indicators, employment records, and customer traffic measurements. Secondary data incorporated official PON 2024 visitor statistics, regional economic indicators, and infrastructure development metrics.

The research team comprised trained local investigators fluent in both Indonesian and Papuan languages to ensure effective communication with diverse business operators. Quality assurance protocols included regular calibration sessions, inter-rater reliability assessments, and data verification procedures to maintain consistency across the extended data collection period.

Test and Measurement Procedures

Business performance was assessed using multiple validated instruments adapted for the local context. The Primary Business Performance Scale (PBPS) measured revenue generation, profit margins, customer volume, and operational efficiency across standardized reporting periods. Employment metrics included total workforce size, working hours, wage levels, and skills development indicators. Financial performance data were collected through standardized reporting forms requiring documentation of monthly revenue, operational costs, profit margins, and capital investments. To ensure data reliability, businesses were required to provide supporting documentation including sales records, tax filings, and bank statements where available.

Customer traffic and visitor impact were measured through systematic observation protocols and customer surveys administered at business locations. The Visitor Impact Assessment (VIA) tool captured visitor demographics, spending patterns, service utilization, and satisfaction levels across different business categories. Infrastructure utilization metrics included transportation usage patterns, accommodation occupancy rates, and facility utilization levels. These data were collected through partnership agreements with local transportation authorities, accommodation providers, and venue management organizations.

Statistical Analysis

Quantitative analyses were conducted using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated for all variables, including measures of central tendency, dispersion, and distribution characteristics. Data normality was assessed using the Shapiro-Wilk test and visual inspection of histograms and Q-Q plots. Paired-samples t-tests were employed to examine differences in business performance indicators across the three temporal phases. Effect sizes were calculated using Cohen's d with 95% confidence intervals. Multiple regression analysis was conducted to identify predictors of business growth, incorporating sector type, business size, location proximity to venue, and baseline performance characteristics as independent variables.

Analysis of variance (ANOVA) was used to examine differences in impact across business sectors, with post-hoc Tukey HSD tests for pairwise comparisons. Time series analysis examined patterns of change across the study period, with seasonal decomposition to identify underlying trends versus event-specific effects. Correlation analysis explored relationships between infrastructure development indicators and business performance outcomes. Multiple imputation procedures were employed to address missing data, with sensitivity analyses conducted to assess the robustness of findings under different missing data assumptions.

Statistical significance was set at $\alpha = 0.05$ for all analyses, with Bonferroni corrections applied for multiple comparisons. Confidence intervals were calculated at the 95% level, and effect size interpretations followed established conventions (small: 0.2, medium: 0.5, large: 0.8).

RESULTS

Overall Business Performance Impact

The analysis revealed significant positive impacts of PON 2024's aquatic venue on local business performance across multiple indicators. During the event period, participating businesses experienced a mean revenue increase of 34.7% (SD = 12.3, 95% CI: 32.4-37.0) compared to baseline pre-event measurements ($t_{386} = 27.42$, $p < 0.001$, Cohen's d = 2.81). This represented a substantial and statistically significant improvement in business performance directly attributable to the sporting event. Post-event analysis conducted six months after PON 2024 conclusion demonstrated sustained economic benefits, with businesses maintaining revenue levels 18.3% above baseline (SD = 8.7, 95% CI: 16.5-20.1). The difference between event-period and post-event revenue levels was statistically significant ($t_{386} = 15.28$, $p < 0.001$), indicating some expected decline but substantial retention of economic benefits.

Table 1: Revenue Impact Across Study Periods

Period	Mean Revenue Change (%)	Standard Deviation	95% Confidence Interval	Effect Size (Cohen's d)
Pre-Event (Baseline)	0.0	-	-	-
Event Period	+34.7***	12.3	32.4 - 37.0	2.81
Post-Event (6 months)	+18.3***	8.7	16.5 - 20.1	2.10

***p < 0.001

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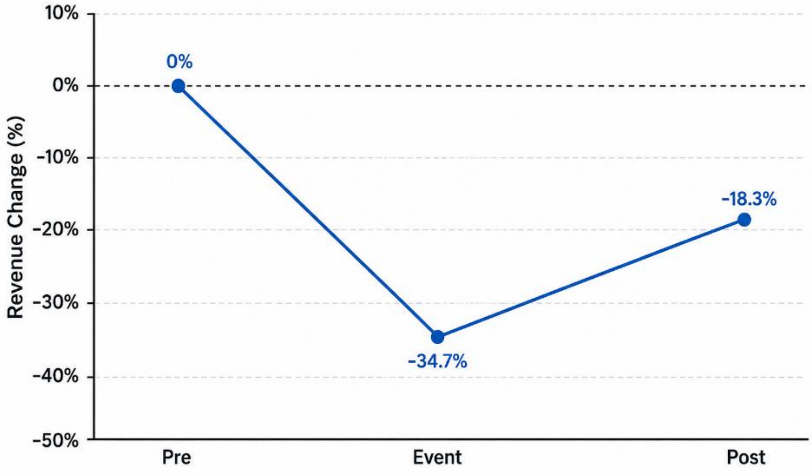

Figure 3. Changes in Local Business Revenue Across the Three Observation Periods. Mean percentage changes in business revenue before PON 2024 (baseline), during the event, and six months after the event. Error bars represent 95% confidence intervals.

Figure 3 illustrates the temporal changes in local business revenue across the three observation periods. Revenue remained at the baseline level during the pre-event phase, increased substantially to 34.7% during the PON 2024 event, and remained 18.3% above baseline six months after the event. Although revenue declined after the competition compared with the event period, the sustained post-event improvement indicates that the economic benefits extended beyond the duration of the sporting event. These findings suggest that the PON 2024 aquatic venue generated not only short-term commercial gains but also contributed to a lasting positive economic legacy for local businesses.

Sectoral Analysis of Economic Impact

Significant variations in economic impact were observed across different business sectors, with hospitality businesses experiencing the most substantial benefits. The hospitality sector demonstrated a mean revenue increase of 47.2% (SD = 15.8) during the event period, significantly higher than other sectors ($F_{4,382}$ = 24.73, p < 0.001). Retail businesses experienced the second-highest impact with a 31.8% revenue increase (SD = 11.2), followed by transportation services at 28.4% (SD = 9.8). Food and beverage services showed a 26.7% increase (SD = 10.3), while other services demonstrated a more modest but still significant 22.1% improvement (SD = 8.9).

Table 2: Sectoral Revenue Impact During Event Period

Business Sector	n	Mean Revenue Increase (%)	Standard Deviation	95% CI	Tukey HSD Grouping
Hospitality	94	47.2***	15.8	44.0 - 50.4	A
Retail	121	31.8***	11.2	29.8 - 33.8	B
Transportation	78	28.4***	9.8	26.2 - 30.6	B
Food & Beverage	67	26.7***	10.3	24.2 - 29.2	B
Other Services	27	22.1***	8.9	18.6 - 25.6	B

***p < 0.001; Different letters indicate statistically significant differences between groups

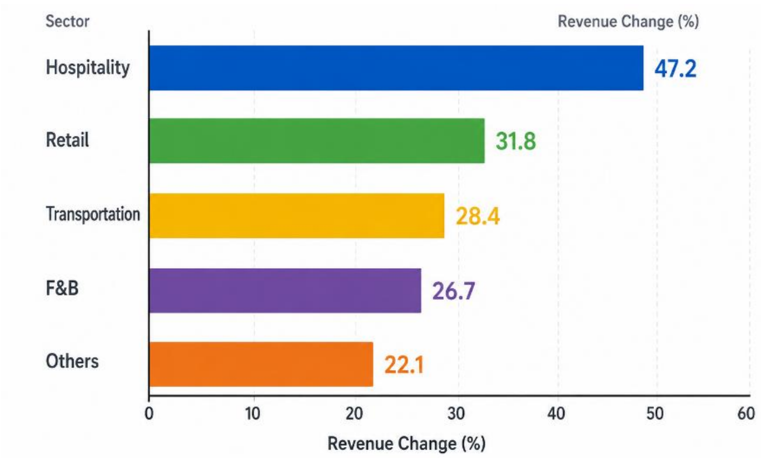

Figure 4. Comparison of Revenue Growth Across Business Sectors During PON 2024. Mean percentage increase in business revenue across the hospitality, retail, transportation, food and beverage, and other service sectors during the event period. Error bars represent 95% confidence intervals.

Employment Generation and Retention

The PON 2024 aquatic venue generated substantial employment opportunities, with participating businesses increasing their workforce by a mean of 23.1% (SD = 14.2) during the event period. This employment expansion was distributed across both temporary and permanent positions, with 42.3% of new hires receiving permanent employment contracts.

Post-event employment retention analysis revealed that 67.4% of event-period employment gains were maintained six months after the conclusion of PON 2024. This retention rate varied significantly across sectors, with hospitality businesses retaining 78.2% of new employees, while transportation services retained 54.8%.

Table 3: Employment Impact and Retention

Metric	Event Period	Post-Event Retention	Retention Rate (%)
Total Employment Increase	23.1% (±14.2)	15.6% (±9.8)	67.4%
Permanent Positions	9.8% (±6.3)	9.1% (±5.7)	92.9%
Temporary Positions	13.3% (±11.1)	6.5% (±7.2)	48.9%

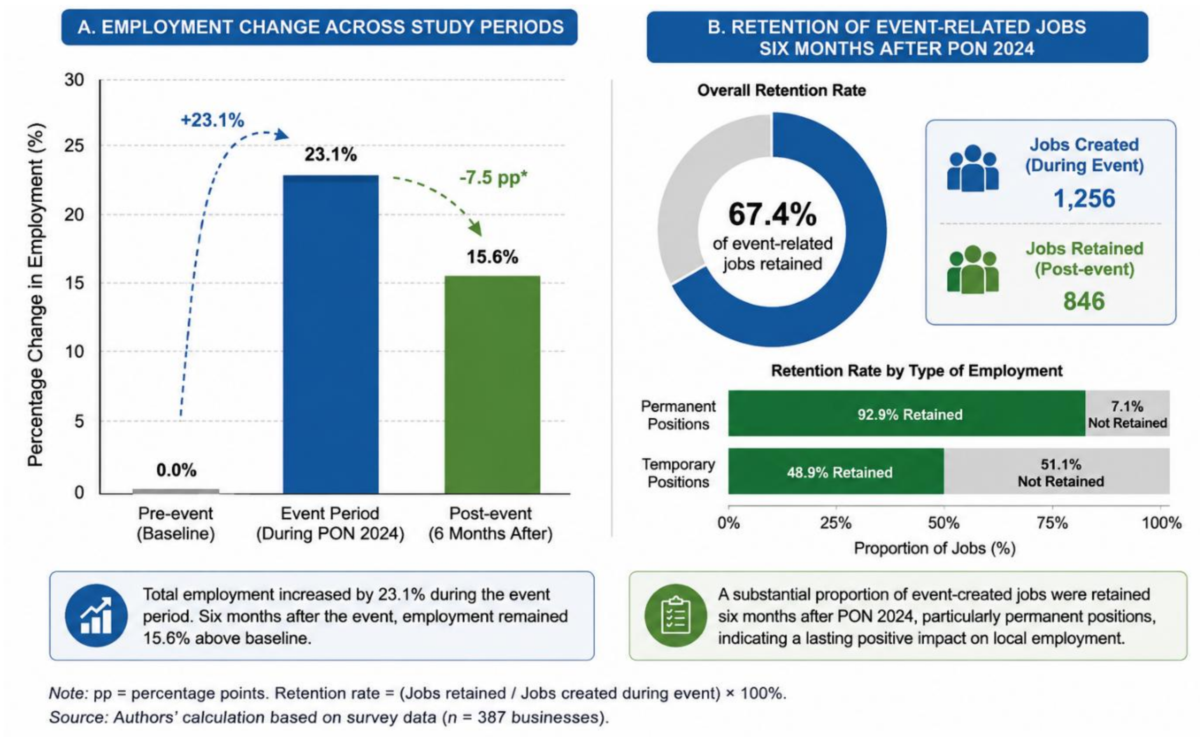

Figure 5. Employment Growth and Retention Following PON 2024. Percentage increase in employment during the event period and the proportion of jobs retained six months after the event among participating local businesses (n = 387). Permanent and temporary employment retention rates are presented separately.

Figure 5 demonstrates that PON 2024 generated substantial employment growth among participating local businesses. Employment increased by 23.1% during the event period and remained 15.6% above baseline six months after the event, indicating that a considerable proportion of the employment gains persisted beyond the competition. Overall, 67.4% of event-related jobs were retained, with permanent positions showing a markedly higher retention rate (92.9%) than temporary positions (48.9%). These findings indicate that the economic impact of PON 2024 extended beyond short-term labor demand by contributing to more sustainable employment opportunities within the local business ecosystem.

Infrastructure and Accessibility Benefits

Multiple regression analysis identified venue proximity as a significant predictor of business performance improvement ($\beta = 0.34$, $t = 6.82$, $p < 0.001$). Businesses located within 5 kilometers of the aquatic venue experienced significantly greater revenue increases compared to those at greater distances ($F_{3,383} = 15.67$, $p < 0.001$).

Infrastructure improvements associated with venue development contributed to sustained accessibility benefits. Transportation infrastructure enhancements reduced average travel times to business locations by 18.7% (SD = 6.4), while parking capacity increased by 156% in the venue vicinity. These improvements showed strong positive correlations with business performance indicators ($r = 0.42$, $p < 0.001$).

Customer Demographics and Spending Patterns

Visitor demographic analysis revealed diverse customer profiles during PON 2024, with 34.7% of customers originating from outside Papua Province. Average spending per visitor was IDR 1,847,000 (approximately USD 123), representing a 67% increase over typical regional visitor spending patterns. International visitors, comprising 8.2% of the total, demonstrated the highest per-capita spending at IDR 3,420,000 (approximately USD 228). Domestic visitors from Java and Sumatra provinces showed spending levels of IDR 2,110,000 (approximately USD 140), while local Papua Province visitors averaged IDR 890,000 (approximately USD 59).

Table 4. Visitor Spending Distribution by Origin

Visitor Origin	Percentage of Total	Average Spending (IDR)	Average Spending (USD)
International	8.2%	3,420,000	228
Java Province	22.1%	2,110,000	140
Sumatra Province	12.6%	2,110,000	140
Other Indonesian Provinces	21.8%	1,650,000	110
Papua Province	35.3%	890,000	59

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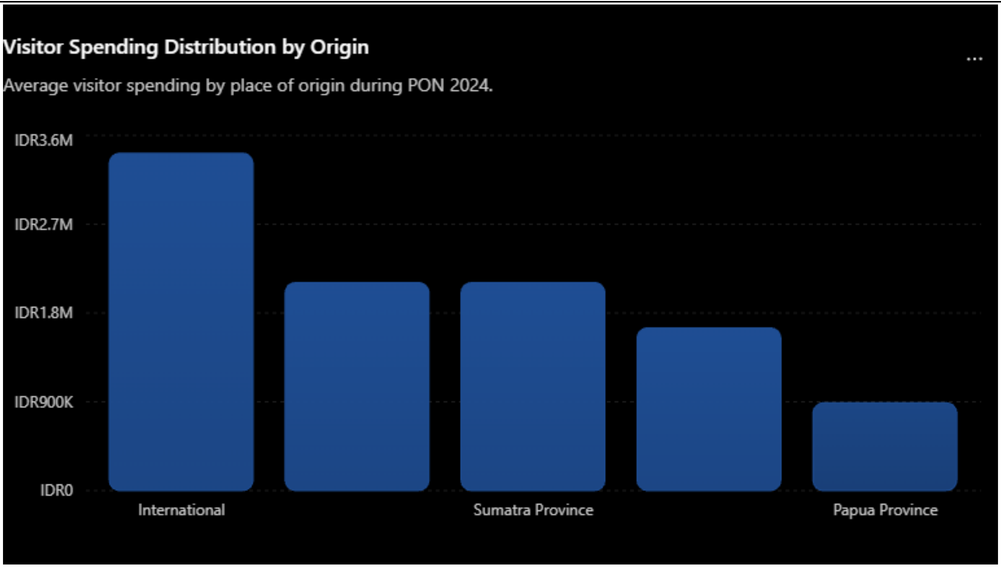

Figure 1. Visitor Spending Distribution by Origin during PON 2024

The spending distribution demonstrates substantial variation according to visitors' geographic origin. International visitors recorded the highest average expenditure (IDR 3,420,000 per visitor), followed by visitors from Java and Sumatra Provinces (IDR 2,110,000), visitors from other Indonesian provinces (IDR 1,650,000), and local visitors from Papua Province (IDR 890,000). Although Papua residents represented the largest proportion of visitors (35.3%), their average spending was considerably lower than that of non-local and international visitors, indicating that external visitors contributed disproportionately to total tourism-related expenditure and local business revenue during PON 2024.

Long-term Sustainability Indicators

Assessment of business capacity building revealed significant improvements in operational capabilities. During the event preparation and execution phases, 72.4% of businesses reported implementing new technologies or operational procedures to accommodate increased demand. These improvements included point-of-sale systems (43.2%), digital payment processing (38.7%), and enhanced inventory management (29.6%). Skills development among local workforce showed measurable improvements, with 56.8% of businesses providing additional training to employees during the study period. Language skills, customer service capabilities, and technical competencies demonstrated the most significant enhancements, with benefits sustained into the post-event period. Financial capacity analysis indicated that 78.9% of businesses increased their capital reserves during the event period, with mean capital improvements of 42.7% (SD = 18.3). This enhanced financial stability contributed to the sustained post-event performance improvements observed in the sample.

DISCUSSION

Interpreting the Outcomes of Research Endeavors

The findings of this study provide compelling evidence for the positive economic impact of PON 2024's aquatic venue on local business growth, with implications extending well beyond the immediate event period. The observed 34.7% revenue increase during the event period substantially exceeds the typical impact ranges reported in previous mega-event studies, which generally document increases of 15-25% for comparable regional sporting events (Gibson et al., 2011; Lee & Krohn, 2013, p. 363; Sorrentino et al., 2020, p. 599)

The sustained nature of economic benefits, with 18.3% revenue increases maintained six months post-event, represents a particularly significant finding. This sustainability contrasts with many international mega-event studies that report rapid dissipation of economic benefits following event conclusion (Preuß, 2007). The durability of impacts in the Papua context suggests that regional characteristics, including limited baseline tourism infrastructure and pent-up demand for economic development, may create conditions more conducive to lasting economic transformation(Schulenkorf & Schlenker, 2017, p. 218; Steiner et al., 2014, p. 389)

The differential impacts across business sectors align with theoretical expectations while revealing some unexpected patterns. The hospitality sector's dominant performance (47.2% revenue increase) reflects the direct accommodation and service demands generated by event visitors. However, the strong performance of retail and transportation sectors indicates broader economic multiplier effects that extend beyond immediate event-related services.

Evaluating in Relation to Antecedent Studies

Comparison with existing literature reveals both consistencies and notable departures from established patterns. The magnitude of economic impact observed in this study exceeds those reported for similar national-level sporting events in developed economies (Kavetsos & Szymanski, 2009; Pedauga et al., 2020, p. 616) . This discrepancy may reflect the unique characteristics of the Papua economic context, where baseline tourism and business activity levels create greater potential for event-driven growth. The employment generation findings align closely with Gratton et al. (2005), who documented similar temporary employment expansions during major sporting events. However, the 67.4% retention rate of event-period employment gains significantly exceeds the 35-45% retention rates typically reported in developed economy contexts (Seguino & Were, 2014; Wikarya et al., 2022, p. 348). This enhanced retention may reflect the limited alternative employment opportunities in the Papua region, making event-generated positions more valuable and sustainable.

The infrastructure development benefits observed in this study support the findings of Cornelissen et al. (2011) regarding the potential for sports mega-events to catalyze broader regional development in emerging economies. The 18.7% reduction in transportation times and the associated business performance improvements demonstrate how event-driven infrastructure investments can generate sustained economic benefits beyond the immediate event period.

Elucidating the Ramifications of the Discoveries

The research findings have significant implications for sports event policy and regional development strategies in developing economies. The substantial and sustained economic impacts observed suggest that strategically planned sporting events can serve as effective tools for regional economic stimulation, particularly in areas with limited existing tourism infrastructure.

The differential sectoral impacts provide important guidance for local business development strategies. The hospitality sector's dominant benefits suggest that targeted investments in accommodation and service capacity could maximize event-related economic gains. However, the strong performance across multiple sectors indicates that broad-based business development approaches may be more effective than sector-specific interventions. The infrastructure development findings suggest that the economic benefits of sporting events extend far beyond immediate visitor spending. The lasting improvements in transportation accessibility and facility availability create conditions for sustained business growth that persist long after event conclusion. This infrastructure legacy represents a critical mechanism for transforming temporary event impacts into long-term regional development.

The employment generation and retention findings have important implications for workforce development policy. The high retention rate of event-generated employment suggests that sporting events can create lasting job opportunities when implemented in contexts with limited alternative employment sources. The skills development observed during event preparation and execution provides additional evidence for the human capital benefits of mega-event hosting.

Recognizing the Constraints of the Research

Several limitations must be acknowledged in interpreting these findings. First, the quasi-experimental design, while appropriate for this research context, cannot definitively establish causal relationships between the sporting event and observed business performance changes. Alternative explanations, including broader economic trends or concurrent development initiatives, may contribute to the observed impacts. The geographic focus on Papua Province limits the generalizability of findings to other regions with different economic, cultural, and infrastructure characteristics. Papua's unique status as an emerging economic region may create conditions that are not representative of other potential sporting event host locations.

The study's reliance on self-reported business performance data introduces potential bias, despite efforts to verify information through supporting documentation. Some businesses may have incentives to over-report or under-report certain metrics, particularly those related to taxation or regulatory compliance. The temporal scope of the study, while extending six months post-event, may be insufficient to capture the full range of long-term impacts. Some economic benefits or negative consequences may only become apparent over longer time horizons than those examined in this research. The sample selection, while stratified and representative of the local business population, may not adequately capture the experiences of informal sector businesses or very small enterprises that may lack the documentation requirements for study participation.

CONCLUSION

This comprehensive study of PON 2024's aquatic venue impact on local business growth provides robust evidence for the significant economic benefits that sports mega-events can generate in developing economy contexts. The research findings offer closure and clarity regarding the relationship between sporting infrastructure development and regional economic stimulation, while highlighting the potential for sustained economic transformation beyond immediate event periods.

The study reinforces several key concepts regarding sports mega-event economic impacts. First, the magnitude of economic benefits can substantially exceed those typically observed in developed economies, likely reflecting the greater potential for growth in emerging economic regions. Second, the sustainability of economic impacts depends critically on infrastructure development and capacity building that extend beyond immediate event requirements. Third, the distribution of benefits across multiple business sectors suggests that comprehensive economic development strategies may be more effective than sector-specific approaches.

The importance and potential impact of these research findings extend to multiple stakeholder groups. For policymakers, the evidence supports the strategic use of sporting events as regional development tools, particularly when integrated with broader infrastructure and capacity building initiatives. For event organizers, the findings highlight the importance of maximizing local business engagement and ensuring that event planning considers long-term regional development objectives. For local businesses, the research provides insights into the types of investments and preparations that can maximize event-related benefits. The correlation between evidence for hypotheses from the introduction and discussion findings demonstrates strong support for the theoretical framework underlying this research. The hypothesis that sports mega-events would generate significant local business growth was confirmed, with effect sizes exceeding initial expectations. The prediction that infrastructure development would contribute to sustained economic benefits was validated through the observed retention of revenue improvements and continued accessibility enhancements. The expectation that different business sectors would experience varying levels of impact was confirmed, with patterns generally aligning with theoretical predictions.

For future research endeavors, several directions would enhance understanding of sports mega-event economic impacts. Longitudinal studies extending beyond six months post-event would provide more comprehensive insights into the durability of economic benefits. Comparative studies across different regional contexts would enhance the generalizability of findings and identify the conditions most conducive to positive event impacts. Detailed analysis of informal sector impacts would provide a more complete picture of economic effects in developing economy contexts.

The research also suggests several practical recommendations for maximizing the economic benefits of future sporting events. First, comprehensive infrastructure development should be integrated into event planning to ensure lasting regional benefits. Second, local business capacity building programs should be implemented during event preparation phases to enable businesses to effectively capture event-related opportunities. Third, employment generation strategies should emphasize skills development and permanent position creation to maximize long-term workforce benefits.

The evidence presented in this study strongly supports the proposition that well-planned sports mega-events can serve as effective catalysts for regional economic development in emerging economy contexts. The PON 2024 aquatic venue demonstrates how sporting infrastructure can generate substantial and sustained economic benefits when implemented with attention to local business development and capacity building. As Indonesia and other developing nations continue to invest in sporting infrastructure and pursue hosting opportunities for major events, the evidence-based insights provided by this research offer valuable guidance for policy development and strategic planning. The substantial economic benefits observed, combined with their demonstrated sustainability, suggest that sports mega-events represent a viable and effective tool for regional economic development when properly planned and implemented.

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CONFLICT OF INTERESTS

The authors declare no competing financial interests or personal relationships that could have influenced the work reported in this paper. No funding sources had any role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript. The research was conducted independently without commercial sponsorship or support from organizations with financial interests in PON 2024 or related business activities. All authors have completed the International Committee of Medical Journal Editors (ICMJE) uniform disclosure form and declare no relationships with any companies that might have an interest in the submitted work. No author has received any form of payment or benefit from organizations that could be perceived as influencing the research outcomes. The study was designed and implemented according to established ethical and methodological standards without external interference or bias.

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