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CHALLENGES AND OPPORTUNITIES FOR SMES IN PAKISTAN'S MARITIME BUSINESS SECTOR

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ABSTRACT

Pakistan's maritime economy offers significant but underexploited opportunities for small and medium-sized enterprises (SMEs). The country's strategic location on the Arabian Sea, its major commercial ports, the development of Gwadar, extensive fisheries resources, coastal communities, shipping activity and growing logistics requirements provide a strong foundation for SME participation in port services, fisheries, seafood processing, marine engineering, coastal tourism, digital logistics, ship repair and other blue-economy activities. Despite this potential, maritime SMEs continue to face structural barriers that limit their competitiveness, scalability and integration into domestic and international value chains. These barriers include restricted access to finance, fragmented regulation, weak infrastructure, limited digital capability, shortages of specialized skills, informality, low value addition, environmental pressures and limited linkages with larger maritime enterprises. This paper examines the principal challenges and emerging opportunities for SMEs in Pakistan's maritime business sector through an integrative review of recent literature, with particular emphasis on research published between 2022 and 2026. The analysis suggests that the future of maritime SME development in Pakistan depends on a shift from a narrow port- and shipping-centered approach toward a broader entrepreneurial ecosystem encompassing logistics, fisheries, tourism, technology, green services and marine industry. Digital transformation, FinTech, green innovation, sustainable fisheries, coastal tourism, port modernization and regional connectivity under CPEC represent important growth opportunities. The paper argues that realizing this potential requires coordinated maritime governance, sector-specific finance, skills development, simplified regulation, stronger university-industry collaboration, SME-oriented procurement systems and better integration of small firms into maritime value chains. A stronger maritime SME ecosystem could contribute significantly to employment generation, export diversification, coastal development and Pakistan's broader blue-economy agenda.

Keywords: *SMEs, maritime business, Pakistan, blue economy, ports, shipping, fisheries, Gwadar, maritime logistics, digital transformation, coastal tourism, entrepreneurship*

Introduction

Small and medium-sized enterprises are widely recognized as important drivers of employment, innovation, local value creation and economic diversification. Their importance becomes even greater in sectors where large infrastructure projects generate extensive demand for supporting services, subcontracting, maintenance, logistics and technology. The maritime economy represents one such sector. While ports, shipping

companies and large logistics operators attract the greatest policy attention, a significant proportion of maritime economic activity depends on smaller firms operating across complex networks of suppliers and service providers.

The modern maritime economy is much broader than conventional shipping and port handling. It includes freight forwarding, warehousing, fisheries, aquaculture, seafood processing, coastal tourism, ship repair, boat building, marine engineering, digital maritime services, environmental consultancy, port technology and a wide range of professional and supporting activities. This broader concept is closely associated with the blue economy, which emphasizes the sustainable use of marine and coastal resources for economic development while maintaining environmental and social balance.

Pakistan possesses substantial natural and strategic advantages for maritime development. Its coastline along the Arabian Sea, its commercial ports at Karachi and Port Qasim, the development of Gwadar and its proximity to major international sea routes provide a strong physical foundation for maritime business activity. Existing scholarship consistently argues that Pakistan's maritime potential remains underutilized relative to its strategic position and resource base (Hasan, 2024; Khalil, 2024; Rehman, 2023; Syed & Safdar, 2022). Fisheries, port logistics, shipping, coastal tourism and marine services have all been identified as sectors capable of contributing more substantially to national economic growth.

Recent empirical research also demonstrates that blue-economy activities such as fisheries, aquaculture and marine trade can support economic development when combined with investment, innovation and sustainable resource management (He et al., 2025). This is particularly relevant for Pakistan because many blue-economy activities are naturally suited to smaller firms. Seafood processing, freight forwarding, boat repair, marine equipment supply, coastal tourism and digital logistics do not necessarily require the scale of a major terminal operator or shipping line.

Pakistan's ports already generate substantial commercial activity. Karachi Port and Port Qasim handle large volumes of imports and exports, while Gwadar has long-term strategic importance under CPEC and regional connectivity initiatives. Port growth creates extensive demand for trucking, warehousing, customs clearance, documentation, equipment repair, catering, security, information technology and other business services. In theory, such demand should support a large ecosystem of competitive SMEs.

In practice, however, smaller maritime firms face multiple constraints. Pakistan's broader SME sector continues to experience challenges involving finance, technological capability, market access, innovation, skills and institutional support. Recent research shows that entrepreneurial orientation, digital transformation, green innovation and technological capability have strong implications for SME performance in Pakistan (Aftab et al., 2022; Ishaq et al., 2024; Li et al., 2025; Shahbaz et al., 2024; Waqar et al., 2026). These constraints become even more significant in maritime businesses because the sector is highly regulated, internationally competitive and often capital intensive.

The central problem is therefore not the absence of maritime opportunities but the limited ability of SMEs to convert those opportunities into sustainable businesses. This paper examines the challenges and opportunities facing SMEs in Pakistan's maritime business sector and develops policy and managerial directions for improving their competitiveness and participation in the blue economy.

Maritime SMEs within the Blue Economy

A maritime SME can be defined as a small or medium-sized enterprise whose activities either directly use marine and coastal resources or provide goods and services to maritime industries. In Pakistan, this category can include freight forwarders, trucking companies, customs agents, warehouse operators, fishing enterprises, seafood processors, boat builders, marine workshops, chandlers, tourism operators, software companies, consultants, environmental-service providers and technical training businesses.

The importance of this broad definition lies in recognizing that maritime development is not generated only by ships and terminals. A port

functions through an ecosystem of interconnected businesses. Similarly, the economic value of fisheries does not end when fish are landed. Value is created through sorting, processing, refrigeration, packaging, certification, logistics, marketing and export. Coastal tourism also depends on accommodation providers, transport operators, guides, recreational services, restaurants and local retailers.

Recent blue-economy literature places growing emphasis on the role of local firms and communities in capturing maritime value. Antonova et al. (2025) argue that blue-economy development should recognize diverse coastal economic practices rather than concentrating benefits in large-scale projects. Alrasyid et al. (2026) similarly demonstrate that coastal micro, small and medium-sized enterprises can support both economic and environmental sustainability when appropriate institutional and market support is available.

For Pakistan, this perspective is particularly important because major maritime infrastructure investments will create broader developmental benefits only if local enterprises are able to participate in the resulting value chains. Ports, economic zones and logistics corridors should therefore be seen not only as infrastructure but as platforms for SME development.

Methodological Approach

This study adopts an integrative review approach and synthesizes recent academic and policy literature relating to Pakistan's maritime economy, blue economy, SMEs, ports, fisheries, logistics, entrepreneurship, digitalization and sustainability. Particular emphasis is placed on studies published between 2022 and 2026 in order to reflect contemporary changes in maritime technology, environmental regulation, SME finance and logistics.

Because direct literature specifically focusing on "maritime SMEs in Pakistan" remains limited, the analysis combines three related bodies of evidence. The first concerns Pakistan's maritime and blue-economy sectors. The second focuses on Pakistani SMEs and examines finance, innovation, technology, green capability and entrepreneurship. The third draws on international studies concerning shipping SMEs, port digitalization, smart ports, coastal MSMEs and sustainable maritime business.

This combined approach allows the paper to develop a more comprehensive understanding of the environment facing maritime SMEs than would be possible from port or blue-economy literature alone.

Pakistan's Maritime Business Environment

Pakistan's maritime economy is concentrated primarily around Karachi, Port Qasim and Gwadar, together with the wider coastal zones of Sindh and Balochistan. Karachi Port and Port Qasim remain the dominant commercial gateways for national trade, while Gwadar has been positioned as a potential regional logistics and connectivity hub.

The development of Gwadar has generated considerable expectations regarding logistics, warehousing, industrial activity and transit trade. However, infrastructure development does not automatically produce local entrepreneurial growth. Khan et al. (2024) demonstrate that Gwadar's development remains closely connected with infrastructure, governance and security challenges. Lin and Iftikhar (2024) similarly identify substantial economic potential alongside operational and geopolitical constraints.

The relationship between major maritime infrastructure and local economic participation is especially important. Talpur et al. (2023) show that port development can generate tensions when traditional fishing communities and existing livelihoods are insufficiently integrated into new development models. This implies that maritime SME policy should not treat traditional enterprises and modern maritime infrastructure as separate or competing spheres. Instead, policy should support the modernization and formalization of local firms so that they can participate in upgraded value chains.

Maritime governance also remains an important issue. Akhtar (2024) argues that Pakistan's blue economy requires improved governance, operational efficiency and sustainability. Iqbal et al. (2024) similarly show that maritime issues have

gained increasing strategic attention, but implementation gaps remain. For SMEs, fragmented governance can translate directly into higher compliance costs, licensing delays and uncertainty.

Access to Finance and Capital Constraints

Restricted access to finance is one of the most serious barriers facing maritime SMEs. Many maritime businesses require greater capital investment than conventional small service firms. Fishing vessels, refrigerated transport, cold storage, marine workshops, tourism boats, processing equipment and logistics systems all involve substantial fixed costs.

Traditional commercial lending practices often place SMEs at a disadvantage because banks typically require formal financial statements, collateral, credit histories and predictable cash flows. Smaller coastal businesses may operate partially informally and may lack the documentation required to obtain conventional finance. This problem is particularly significant in less developed coastal areas where banking penetration is lower.

The financing problem is not simply about the quantity of credit available. It also reflects the lack of financial products designed for maritime business models. Equipment leasing, vessel finance, receivables financing, export credit, working-capital facilities and cold-chain financing require specialized assessment methods.

FinTech may offer a partial solution. Waqar et al. (2026) find that FinTech adoption can contribute positively to sustainable SME performance in Pakistan through improved financial access, innovation and supply-chain practices. Digital transaction records, electronic invoicing and supply-chain finance could therefore help maritime SMEs build credible financial histories and reduce dependence on traditional collateral-based lending.

A more effective maritime SME financing framework would combine commercial banking, credit guarantees, leasing, export finance and digital financial services.

Fragmented Regulation and Administrative Burden

Maritime business in Pakistan involves numerous regulatory institutions. Ports, shipping, customs, fisheries, provincial governments, environmental agencies, security authorities and local administrations may all have jurisdiction over different parts of maritime activity.

This fragmented structure increases transaction costs for SMEs. Large firms can maintain legal, regulatory and compliance teams, whereas smaller enterprises often rely on owners or a limited administrative staff. Repeated licensing, documentation and inspections therefore impose a disproportionate burden.

Pakistan's blue-economy literature repeatedly identifies governance and institutional fragmentation as important obstacles to maritime development (Akhtar, 2024; Hasan, 2024; Rehman, 2023). The solution is not indiscriminate deregulation. Maritime activities necessarily require strong safety, environmental, labour and security standards. The more appropriate objective is simplification, digitalization and regulatory coordination.

Single-window licensing and port-community systems could significantly reduce administrative burdens for smaller firms while improving transparency.

Infrastructure and Port-Hinterland Constraints

SMEs depend on the efficiency of the wider infrastructure network in which they operate. A port can have modern cranes and deep-water berths, but smaller firms will still face high costs if roads are congested, rail connections are weak, electricity is unreliable or warehouses are inadequate.

Infrastructure deficiencies are particularly damaging to SMEs because they generally maintain lower inventory buffers and have less financial capacity to absorb delays. A small seafood exporter may suffer disproportionately from refrigeration failures, customs delays or unreliable transport because a single disrupted shipment can threaten working capital.

The development of Karachi Port, Port Qasim and Gwadar therefore needs to be linked with logistics

parks, cold chains, road and rail systems, and digitally integrated customs processes. Infrastructure should be considered as part of an SME ecosystem rather than only as large-scale national investment.

Digital Capability and Technology Adoption

The global maritime sector is undergoing rapid digital transformation. Ports increasingly use integrated information systems, artificial intelligence, blockchain applications, Internet of Things technologies, automated gates, digital twins and real-time cargo tracking.

Behdani (2023) describes this development as Port 4.0, in which digital systems integrate previously fragmented port processes. Zhang et al. (2024) show that digitalization can improve efficiency, reduce environmental impacts and support green-port development. Almeida and Okon (2024) also demonstrate that digital port systems can contribute to sustainable development.

For maritime SMEs, digitalization creates both opportunities and risks. Firms that adopt digital freight management, electronic invoicing, cargo tracking and customer-management systems can improve efficiency and competitiveness. Firms that remain technologically weak may gradually be excluded from increasingly digital port ecosystems. Research on shipping SMEs shows that firms can enter a "digital transformation dead zone" where they recognize the importance of technology but lack the organizational capability, financial resources or skills needed for implementation (Nguyen & Le, 2025). Similar evidence from Pakistan shows that digital technology can improve SME value creation and business performance, but capability and managerial readiness strongly influence outcomes (Jan et al., 2025; Zahra et al., 2025).

Maritime digitalization policy should therefore combine technology adoption with training, shared platforms, cybersecurity support and affordable access to digital systems.

Human Capital and Maritime Skills

A competitive maritime SME sector requires specialized technical and managerial skills. Marine engineering, refrigeration, seafood quality assurance, customs documentation, logistics management, maritime law, safety, environmental compliance and digital systems all require sector-specific knowledge.

Hasan (2024) identifies human-resource constraints as an important barrier to Pakistan's maritime development. Smaller firms often struggle to attract skilled personnel because they cannot match the salaries offered by large domestic or multinational organizations.

The skills challenge is likely to become more serious as ports become increasingly automated and international environmental and quality requirements become more demanding. Training institutions should therefore expand beyond traditional seafaring education and develop programmes in logistics technology, marine engineering, seafood certification, aquaculture, maritime entrepreneurship, coastal tourism and environmental services.

Universities can also play a larger role by linking students and researchers with maritime SMEs through internships, applied projects and incubation programmes.

Environmental Pressures and Sustainability

Maritime business depends directly on environmental quality. Pollution, coastal degradation, overfishing, mangrove loss and climate-related events therefore affect commercial viability as well as ecological sustainability.

Mohsin et al. (2024) identify multiple environmental and sustainability risks affecting Pakistan's seafood trade. Amin et al. (2024) similarly highlight environmental and governance pressures affecting coastal tourism.

For SMEs, environmental compliance is increasingly linked with market access. International buyers and shipping companies are imposing stricter traceability, waste-management, carbon and sustainability requirements. Firms unable to demonstrate compliance may gradually lose access to higher-value customers.

At the same time, sustainability creates opportunities. Research on Pakistani SMEs shows that green absorptive capacity, green innovation and environmental capability can improve firm performance (Li et al., 2025; Shahbaz et al., 2024).

Maritime SMEs can therefore treat environmental capability as a source of competitiveness rather than merely a compliance cost.

Informality and Weak Integration into Formal Value Chains

A significant proportion of coastal and maritime economic activity remains informal. Informality can reduce immediate administrative costs, but it limits long-term growth.

Informal firms typically face difficulties obtaining bank finance, insurance, export contracts, quality certifications and government support. They also remain largely invisible to large port operators and shipping companies that require formal procurement procedures.

This weak integration into formal value chains is one of the most important barriers to maritime SME growth. Pakistan's ports and terminal operators could address this issue through structured supplier-development programmes that help smaller firms achieve required standards and compete for contracts.

Formalization should therefore be encouraged through incentives and simplified procedures rather than only through enforcement.

Low Value Addition in Fisheries and Seafood

Fisheries represent one of the most accessible maritime sectors for SMEs, but much of Pakistan's economic activity remains concentrated at the lower-value end of the chain.

The greatest economic returns are not generated simply by catching fish. Significant value is created through hygienic handling, grading, freezing, processing, packaging, branding, certification, cold-chain logistics and export marketing.

Mohsin et al. (2024) demonstrate the importance of sustainability and marine conservation for Pakistan's seafood trade, while Xia et al. (2025) identify significant export opportunities, particularly in relation to China and regional markets.

Pakistan therefore needs to shift from a volume-based fisheries model toward a value-added seafood economy. This shift could create numerous SME opportunities in cold storage, packaging, logistics, laboratories, feed supply, aquaculture and export services.

Security and Geopolitical Risk

Maritime SMEs operate within a sector that is strategically sensitive. Port security, smuggling, regional geopolitical tensions, piracy risks and instability can increase operating costs and insurance requirements.

Gwadar demonstrates the close relationship between security and economic development. Khan et al. (2024) emphasize the need for an integrated security framework to support sustainable port development.

The challenge is to create security arrangements that protect critical infrastructure while minimizing unnecessary commercial friction. Smaller firms are particularly sensitive to access restrictions, documentation requirements and administrative delays.

Security policy should therefore distinguish between legitimate risk management and excessive operational complexity.

Opportunities in Port Logistics and Support Services

The most immediate opportunities for maritime SMEs lie in services surrounding existing port operations. Growing cargo volumes generate continuous demand for trucking, freight forwarding, customs brokerage, warehousing, equipment rental, maintenance, packaging, inspection, catering and administrative services.

These activities generally require lower capital investment than vessel ownership or terminal development, making them particularly suitable for SMEs.

Port modernization can also generate opportunities for technology firms. Digital cargo tracking, gate management, fleet software, cybersecurity, sensors and predictive-maintenance systems increasingly form part of modern port operations.

Almeida and Okon (2024), Alzate et al. (2024) and Behdani (2023) all indicate that digital port development creates a wider ecosystem of technology and service providers rather than simply automating existing functions.

Pakistan's maritime SME strategy should therefore treat ports as business ecosystems rather than only as infrastructure nodes.

Fisheries, Aquaculture and Seafood Processing

Fisheries and aquaculture represent some of the strongest opportunities for maritime SMEs in Pakistan because they combine natural resources with export potential.

Xia et al. (2025) demonstrate that Pakistan's seafood trade can benefit from regional trade relationships, particularly with China. He et al. (2025) also identify fisheries and aquaculture as important elements of Pakistan's blue-economy potential.

The opportunity extends far beyond primary harvesting. Small and medium enterprises can participate in hatcheries, feed supply, processing, cold storage, quality testing, packaging, traceability, refrigerated transport and export marketing.

Aquaculture is particularly important because it can provide more controlled production, improve quality consistency and reduce pressure on wild fish stocks.

A carefully designed fisheries-SME policy could therefore generate employment, improve export earnings and strengthen coastal livelihoods simultaneously.

Gwadar and Regional Connectivity

Gwadar offers important long-term opportunities for logistics, warehousing, food supply, maintenance, transport, accommodation and professional services.

Its greatest potential lies in the possibility of connecting western China, Central Asia, Afghanistan and Gulf markets with the Arabian Sea. If regional trade develops successfully, SMEs could participate in trucking, customs brokerage, freight consolidation, storage, repair and digital logistics.

However, local economic participation cannot be assumed. Talpur et al. (2023) demonstrate the importance of protecting and integrating traditional fishing communities into development.

Gwadar's SME strategy should therefore combine investment attraction with local supplier development, vocational training and community entrepreneurship.

Coastal and Maritime Tourism

Pakistan's coastline contains beaches, islands, mangrove ecosystems, fishing communities and potential recreational destinations, but coastal tourism remains underdeveloped.

Khan and Rehman (2025) identify coastal and maritime tourism as an important component of Pakistan's blue economy, while Amin et al. (2024) highlight environmental, infrastructure and governance constraints.

These challenges also reveal significant opportunities for SMEs. Small hotels, eco-lodges, restaurants, recreational boat services, diving operations, tour companies, handicraft businesses and local transport providers can create employment at relatively modest levels of capital investment.

Tourism development should emphasize sustainability and community participation rather than uncontrolled coastal construction.

Ship Repair, Boat Building and Marine Engineering

Pakistan's maritime sector generates continuous demand for vessel maintenance, engineering and technical services.

Fishing boats, commercial vessels, port equipment and offshore facilities require electrical, mechanical and electronic repair. This creates opportunities for workshops, spare-parts suppliers, welding firms, marine electronics companies and technical consultancies.

SME development in this area could reduce dependence on imported services and equipment while generating skilled employment.

Joint ventures with foreign marine-engineering companies could also accelerate technology transfer.

Digital Maritime Entrepreneurship

Digitalization allows firms to participate in maritime business without owning ships, terminals or large physical assets.

Potential opportunities include cargo-tracking applications, digital freight marketplaces, customs-documentation systems, fleet management, predictive maintenance, maritime cybersecurity, AI-based logistics and electronic payment solutions.

Lam et al. (2024) show that digital transformation can significantly improve logistics performance, while Homayouni et al. (2025) demonstrate the potential of digital twins to improve seaport management and sustainability.

Pakistan's technology sector could therefore become an important part of the maritime economy even outside traditional coastal locations.

FinTech and Trade Finance

FinTech represents a particularly important opportunity because it can address one of the most persistent SME constraints: access to finance.

Digital payments, electronic invoices, transaction records and alternative credit scoring can allow financial institutions to assess smaller enterprises more accurately.

Waqar et al. (2026) find that FinTech adoption positively influences sustainable SME performance in Pakistan.

Maritime trade-finance products could potentially integrate port, customs and logistics data to improve credit decisions. This could support working-capital finance for freight operators, exporters and seafood companies.

Green Ports and Environmental Services

Environmental transition is creating new maritime markets.

Ports increasingly require renewable energy, waste management, environmental monitoring, pollution control, recycling, emissions measurement and energy-efficiency services.

This creates significant opportunities for engineering and environmental SMEs.

Research shows a growing relationship between port digitalization, environmental performance and green infrastructure (Almeida & Okon, 2024; Zhang et al., 2024).

Pakistani SMEs could participate in solar installations, ship-waste services, environmental auditing, energy management, mangrove restoration and pollution monitoring.

The transition toward greener maritime operations should therefore be viewed as a business-development opportunity as well as an environmental necessity.

Maritime Training and Professional Services

A growing maritime economy also creates demand for professional and knowledge-based services.

Accounting firms, legal practices, insurance specialists, compliance consultants, safety trainers, environmental auditors and crew-management companies can all operate as SMEs.

Regulatory modernization creates additional demand for these services. Khan et al. (2025) identify the need for legal modernization in Pakistan's maritime labour framework.

Smaller maritime operators often cannot maintain specialized compliance teams, creating a market for external professional-service providers.

Digital Transformation as a Cross-Cutting Enabler

Digitalization should not be considered a separate maritime subsector because it affects almost every part of the SME ecosystem.

Freight companies can use digital platforms for booking, tracking and invoicing. Seafood firms can use digital traceability. Tourism operators can access customers through online platforms. Marine workshops can adopt predictive maintenance systems. Exporters can use digital customs and trade-finance systems.

Pakistani SME research demonstrates that digital capabilities can significantly influence firm performance and innovation (Jan et al., 2025; Zahra et al., 2025).

The key policy challenge is to prevent digital transformation from widening the gap between large and small firms.

SME digital programmes should therefore combine financial support, skills development, shared infrastructure and cybersecurity guidance.

Green Transition and SME Competitiveness

The global maritime economy is becoming more environmentally regulated.

Shipping lines, exporters and international buyers increasingly assess suppliers on carbon, waste, energy and traceability criteria.

This creates short-term compliance costs but also long-term opportunities for firms that develop green capabilities early.

Li et al. (2025) show that green absorptive capacity and innovation can improve environmental performance in Pakistani SMEs, while Shahbaz et al. (2024) identify green intellectual capital as an important driver of green innovation.

Maritime SMEs that develop sustainability capabilities may therefore gain access to better customers, financing and export markets.

Pakistan should treat green compliance as part of competitiveness policy rather than merely environmental regulation.

Entrepreneurship, Innovation and Export Competitiveness

Infrastructure alone cannot create a competitive maritime SME sector. Entrepreneurial capability remains essential.

Aftab et al. (2022) find that entrepreneurial orientation, competencies and innovation contribute positively to SME performance in Pakistan. Ayaz and Chelliah (2023) similarly show that innovation and competitive advantage influence export performance.

These findings are directly relevant to maritime businesses.

A seafood exporter competing only through low prices remains vulnerable. A firm offering certified, traceable and branded seafood can compete through quality and differentiation.

Similarly, a traditional freight forwarder may compete through personal relationships, while a digitally integrated logistics company can compete through visibility, data, speed and integrated service.

Maritime SME policy should therefore encourage innovation, specialization and export orientation rather than simply increasing the number of small businesses.

Policy Directions for Maritime SME Development

Pakistan needs a dedicated maritime SME framework within its broader blue-economy and SME policies. Such a framework should identify priority sectors including logistics, fisheries, aquaculture, seafood processing, tourism, marine engineering, digital services and environmental services.

Maritime SME clusters should be developed around Karachi, Port Qasim and Gwadar. Shared facilities could significantly reduce individual investment requirements. Seafood clusters could provide laboratories, cold storage and certification services, while marine-engineering clusters could provide shared machinery, testing equipment and training.

Specialized finance should also become a major policy priority. Banks and development-finance institutions should introduce equipment leasing, refrigerated-vehicle finance, vessel financing, export receivables products and credit-guarantee mechanisms specifically suited to maritime businesses.

Port authorities and terminal operators should establish supplier-development programmes that allow qualified SMEs to participate in procurement. Firms should receive guidance on certification, bidding procedures and quality requirements.

Port digitalization should be designed to include rather than exclude SMEs. Affordable access to digital systems, standardized interfaces, cybersecurity guidance and training are essential.

Fisheries policy should emphasize value addition rather than raw landings. Investment should target processing, hygiene, cold chains, traceability, certification and export marketing.

Coastal tourism should support community-based enterprises while maintaining environmental standards and carrying-capacity limits.

Universities and technical institutes should collaborate with maritime companies to strengthen skills, research and entrepreneurship.

Finally, licensing and regulatory procedures should be simplified and digitized while preserving international safety, environmental and security standards.

Managerial Implications for Maritime SMEs

Maritime SME owners and managers also need to adapt their strategies.

Digital capability should be treated as a core business investment rather than an optional administrative tool. Even relatively simple systems for accounting, inventory, customer management and shipment tracking can improve efficiency and credibility.

Specialization can also improve competitiveness. Smaller firms may find it difficult to compete directly with large integrated logistics providers, but they can develop strong positions in niche areas such as cold-chain transport, marine electronics, seafood certification, environmental services or specialized vessel repair.

Quality and certification should be viewed as market-access investments. International standards can improve credibility with port operators, exporters and foreign buyers.

Collaboration can reduce SME disadvantages. Associations and clusters can allow firms to share training, laboratories, equipment, warehousing and export services.

Sustainability should also become part of long-term business strategy. Recent evidence from Pakistan suggests that digitalization, environmental capability and innovation increasingly reinforce commercial performance rather than conflict with it (Li et al., 2025; Waqar et al., 2026).

Discussion

The central argument emerging from this review is that Pakistan does not lack maritime business opportunities. The more serious problem is the absence of a sufficiently strong entrepreneurial ecosystem capable of converting maritime infrastructure and resources into competitive SMEs.

Ports can create economic opportunity, but smaller firms require finance, skills, procurement access and digital capability to capture it. Fisheries can generate exports, but value addition depends on cold chains, certification and marketing. Gwadar can improve connectivity, but local SMEs require structured inclusion. Digital transformation can improve efficiency, but it can also deepen inequality between firms if smaller businesses cannot afford adoption.

The distinction between maritime infrastructure development and maritime enterprise development is therefore critical.

Pakistan has historically placed greater emphasis on infrastructure, strategic geography and large public or foreign investment projects. These remain important, but the broader developmental impact of maritime investment depends on the number and quality of local enterprises that emerge around them.

International evidence increasingly supports this ecosystem perspective. Alrasyid et al. (2026) show that coastal MSME sustainability depends heavily on institutional support and enterprise capability. Antonova et al. (2025) emphasize the importance of retaining economic value within coastal communities.

For Pakistan, maritime development should therefore be assessed not only through cargo volumes, infrastructure spending or port capacity, but also through SME creation, local procurement, employment, exports, digital adoption, innovation and coastal income growth.

Future Research Directions

The literature reveals a significant empirical gap concerning maritime SMEs in Pakistan.

Future research should establish the number, size, location and sectoral distribution of maritime SMEs. Many firms currently appear under broader categories such as logistics, fisheries, engineering or tourism, making the maritime SME economy difficult to measure.

Firm-level surveys should investigate financing constraints, regulatory burdens, technology adoption, export participation, skills and sustainability practices.

Comparative research among Karachi Port, Port Qasim and Gwadar would be particularly valuable because each represents a different business environment.

Further research should examine women's participation in maritime SMEs, particularly in seafood processing, coastal tourism, handicrafts and digital services.

The role of artificial intelligence, blockchain, IoT, digital twins and automated logistics systems also requires greater attention.

Research should additionally assess whether CPEC-related maritime investment has generated measurable spillovers for local SMEs, especially in Gwadar.

Longitudinal studies are needed to determine whether digitalization, green investment and formalization improve the survival and profitability of maritime SMEs over time.

Conclusion

Pakistan's maritime economy offers substantial opportunities for SME-led development across logistics, fisheries, aquaculture, seafood processing, coastal tourism, marine engineering, digital technology and environmental services.

The country's strategic location, port infrastructure, marine resources and growing connectivity provide a strong foundation, but these advantages have not yet translated into a fully developed maritime entrepreneurial ecosystem.

SMEs continue to face restricted access to finance, fragmented regulation, infrastructure weaknesses, low digital capability, shortages of specialized skills, informality, limited value addition and environmental pressures.

These constraints are significant because smaller firms possess fewer resources to absorb delays, compliance costs and technological change.

At the same time, the opportunity structure is improving. Port modernization is creating demand for logistics and technical services. Seafood trade offers room for higher-value processing. Gwadar can generate local service industries if development becomes better connected with communities and businesses. Coastal tourism remains underdeveloped. Digitalization allows technology firms to participate in maritime markets without owning traditional maritime assets. FinTech can improve financial access, while green-port development creates entirely new markets for environmental and engineering services.

Pakistan should therefore move beyond a narrow view of maritime development focused primarily on ports and shipping assets. The sector should instead be approached as an interconnected enterprise ecosystem.

Port investment should be linked with local supplier development. Fisheries policy should emphasize value addition. Finance should be tailored to maritime assets and business cycles. Digital systems should be accessible to SMEs. Training institutions should provide both technical and entrepreneurial skills. Environmental standards should be supported by mechanisms that help smaller firms comply rather than excluding them from the market.

If these measures are implemented coherently, maritime SMEs can become one of the most important mechanisms for translating Pakistan's strategic maritime position into broad-based economic development. A stronger SME ecosystem would not only improve port and supply-chain efficiency but also create employment, expand exports, strengthen coastal communities, encourage innovation and contribute to a more inclusive and sustainable blue economy.

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