

Beyond Manufacturing Towards Innovation-Driven New Product Development In Malaysia's Automotive Industry

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Abstract

Malaysia's automotive industry has established strong manufacturing and supply chain capabilities, yet it needs greater emphasis on innovation to strengthen technological capability, product differentiation, and long-term competitiveness. This article examines how innovation-driven new product development supports Malaysia's automotive industry transition from conventional manufacturing to higher-value activities. The analysis focuses on four interconnected areas: strategic new product development, technological and digital capability, market-driven product innovation, and organisational innovation capability. The article identifies several critical challenges, including a persistent manufacturing-centred orientation, limited technological and digital capabilities, difficulty translating market intelligence into distinctive customer value, and organisational fragmentation that limits continuous innovation. The discussion shows that technology adoption alone cannot generate sustainable innovation and that firms must integrate technological learning, customer knowledge, employee capabilities, organisational learning, and cross-functional collaboration into product development. Accordingly, the article proposes four strategic directions: developing adaptive product innovation systems, transforming technology adoption into an internal innovation capability, establishing market intelligence-driven product development, and creating an integrated organisational innovation ecosystem. Overall, innovation-driven new product development provides an important pathway for Malaysian automotive manufacturers and suppliers to transform existing manufacturing strengths into stronger innovation capability, differentiated products, greater customer value, and sustainable competitive performance.

Keywords: Automotive, Innovation, Development, Technology, Competitiveness

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1. Introduction

Malaysia's automotive industry has played an important role in the country's industrialisation by supporting manufacturing activities, employment, supplier development, technology adoption, and the growth of related industries. Nevertheless, expansion in production capacity does not necessarily indicate that the industry has achieved equivalent progress in technological capability, innovation, or international competitiveness. Wad and Govindaraju (2011) observed that although Malaysia developed significant automotive production, sales, employment, and local content, weaknesses remained in technological capability, marketing capability, industrial upgrading, and participation in global value chains. These limitations suggest that the future development of the industry requires firms to move progressively beyond conventional manufacturing and strengthen their capacity to create higher value products. Technology adoption is particularly important within this transition because Malaysian automotive suppliers operate in supply networks where organisational characteristics and external pressures influence the adoption of new technologies (Kamaruddin & Udin, 2009). Zailani et al. (2015) further demonstrate that organisational initiatives, market demand, and environmental requirements influence innovation adoption within Malaysia's automotive supply chain. Consequently, innovation driven new product development provides an important pathway through which automotive manufacturers and suppliers can strengthen technological learning, product differentiation, market responsiveness, and competitive positioning.

Moving beyond manufacturing requires automotive firms to treat new product development as a strategic business capability rather than an activity concerned primarily with engineering and production. NPD involves opportunity identification, product concept development, customer analysis, technical design, testing, project evaluation, commercialisation, and continuous improvement. Cooper (2019) explains that successful NPD is supported by strong customer orientation, strategic alignment, effective project execution, appropriate portfolio management, and clear development decisions. Florén et al. (2018) similarly emphasise the importance of early development activities because decisions regarding customer problems, product ideas, and concepts can influence later project performance. Knowledge integration is also fundamental because product development requires firms to combine technical, managerial, supplier, and market information. Gao and Bernard (2018) highlight knowledge sharing as an important mechanism for strengthening NPD, while Mu et al. (2017) demonstrate that strategic orientation can improve product development performance through networking capability. These considerations are especially relevant to the automotive industry because vehicle and component development involves complex technologies, extensive supplier relationships, substantial investment, demanding quality requirements, and considerable market uncertainty. Malaysian automotive firms therefore require strategically managed NPD processes capable of connecting technological possibilities with customer value and commercially viable market opportunities.

The effectiveness of this transition also depends heavily on innovation capability because establishing a formal product development process does not guarantee that firms can consistently produce successful innovations. Innovation capability represents the organisational ability to mobilise knowledge, employee skills, technologies, management practices, financial resources, learning processes, and external relationships to support innovation. Saunila (2020), through a systematic review of innovation capability in SMEs, demonstrates that innovation capability is multidimensional and closely associated with organisational practices and innovation outcomes. Panizzon et al. (2020) similarly identify strategic and organisational determinants that affect firms' ability to develop new products for competitive markets. In addition, Liu et al. (2020) demonstrate that dynamic capability can influence the relationship between NPD and sustainable performance, suggesting that organisations need the capacity to reconfigure resources when business conditions change. Such adaptability is particularly relevant to automotive manufacturers and suppliers because technological development can quickly change product requirements, production processes, and competitive expectations. Innovation capability should therefore extend beyond research and development activities. Malaysian automotive firms need leadership commitment, employee competence, organisational learning, knowledge sharing, external collaboration, and flexible resource deployment to transform new ideas and technological opportunities into marketable automotive products and sustained competitive value.

Digital technologies further strengthen the need to move beyond traditional manufacturing because they are changing the manner in which organisations develop products, coordinate employees, communicate with partners, and manage innovation knowledge. Marion and Fixson (2021) explain that digital tools are transforming NPD by reshaping work arrangements, collaboration, decision making, and organisational interaction. These changes

allow firms to exchange development information more rapidly and improve coordination among geographically or functionally separated participants. Pesch et al. (2021) additionally demonstrate that digital product innovation requires firms to balance formalisation with organisational fluidity, showing that structure remains necessary but should not prevent experimentation and adaptation. Iqbal and Suzianti (2021) identify technological tools, collaboration, innovation sources, process design, and continuous improvement as important considerations when designing effective NPD processes. Their findings are particularly relevant to automotive suppliers that may have fewer resources than major manufacturers but remain increasingly involved in technologically sophisticated development activities. Digital transformation should therefore not be approached merely through the acquisition of advanced software, equipment, or information systems. Malaysian automotive firms must integrate digital technologies with employee skills, development routines, knowledge management, supplier collaboration, and strategic product objectives if digital investment is expected to generate meaningful improvements in automotive innovation.

Market knowledge is another critical element because technological advancement does not automatically produce commercially successful automotive products. Customers evaluate vehicles and related products according to multiple dimensions, including quality, reliability, functionality, affordability, design, convenience, safety, and perceived value. Najafi-Tavani et al. (2016) demonstrate that market orientation contributes to new product performance and that absorptive capacity strengthens the ability of firms to utilise market knowledge effectively. Customer information must therefore be interpreted and converted into development priorities rather than simply collected. Purchase and Volery (2020) further explain that marketing innovation includes meaningful changes in product design, distribution, promotion, and pricing, illustrating that value creation extends beyond technological innovation alone. Morgan and Anokhin (2020) demonstrate that entrepreneurial orientation and market orientation can jointly influence NPD performance, although their effects depend on organisational and environmental conditions. These perspectives are particularly important for Malaysian automotive firms seeking to move from manufacturing based competition toward innovation based competition. Firms need to understand existing customer requirements while simultaneously identifying emerging market opportunities. Product development should consequently integrate market intelligence, engineering capability, competitor information, technological possibilities, and strategic foresight to generate automotive products capable of creating stronger customer value and meaningful market differentiation.

Achieving innovation driven automotive development ultimately requires the integration of strategic NPD, technological capability, market orientation, organisational learning, and effective resource management. Product innovation produces stronger performance when technical capabilities are supported by complementary organisational and marketing resources, as demonstrated by Sok et al. (2016). Yu et al. (2020) further indicate that investment in new product activities can contribute to innovation performance when development resources are effectively converted into valuable outcomes. Forti et al. (2020) show that managerial choices involving product attributes and development teams can influence new product performance, while Malek et al. (2020) demonstrate that employee motivation and reward structures also affect NPD outcomes. Ferreras-Méndez et al. (2021) further establish that entrepreneurial orientation can strengthen NPD performance through business model innovation, reinforcing the importance of complementary organisational mechanisms. These findings suggest that automotive competitiveness cannot be strengthened through manufacturing efficiency or technology acquisition in isolation. Instead, firms need an integrated innovation system capable of continuously converting knowledge, technologies, customer insights, employee capabilities, and market opportunities into commercially valuable products. Accordingly, this article examines how innovation driven NPD can support Malaysia's automotive industry in progressing beyond manufacturing toward stronger technological capability, product innovation, market differentiation, and sustainable competitive performance.

2. Literature Review

The transition of Malaysia's automotive industry from manufacturing oriented activities towards innovation driven development requires a broader understanding of how new product development, technological capability, market knowledge, and organisational innovation interact. Previous studies have established that NPD is no longer limited to technical product creation but involves the integration of strategic planning, customer knowledge, organisational resources, technological competencies, and external collaboration. Cooper (2019) identifies

strategic alignment and customer orientation as important drivers of successful product innovation, while Saunila (2020) demonstrates that innovation capability consists of several organisational dimensions that collectively influence innovation outcomes. In the Malaysian automotive context, earlier research indicates that technological development and industrial upgrading remain important for improving international competitiveness (Wad & Govindaraju, 2011). Similarly, Zailani et al. (2015) demonstrate that organisational initiatives and market pressures influence innovation adoption within Malaysia's automotive supply chain. By 2021, digitalisation had further expanded the requirements for effective NPD through new approaches to collaboration, knowledge exchange, and innovation management (Marion & Fixson, 2021; Iqbal & Suzianti, 2021). Therefore, the literature is examined through four interconnected areas involving strategic NPD, technological and digital capability, market driven product innovation, and organisational innovation capability for competitive performance.

2.1 Strategic New Product Development for Automotive Value Creation

Strategic NPD provides an important mechanism through which automotive firms can convert technological opportunities, organisational knowledge, and market requirements into commercially valuable products. Cooper (2019) explains that successful product innovation requires strong strategic alignment, customer focus, effective project execution, portfolio management, and appropriate development decisions. These requirements are particularly relevant to automotive development because vehicle and component projects involve considerable investment, engineering complexity, quality requirements, and coordination among numerous internal and external participants. Florén et al. (2018) further emphasise that the early stages of NPD are critical because decisions involving opportunity identification, customer problems, idea generation, and concept evaluation influence subsequent development performance. Knowledge sharing also contributes significantly to this process. Gao and Bernard (2018) argue that effective knowledge exchange enables organisations to integrate information from different participants during product development. Mu et al. (2017) similarly demonstrate that strategic orientation can strengthen NPD performance through networking capability and networking ability. These findings indicate that automotive NPD should not operate as an isolated engineering function. Instead, product development should connect corporate strategy, engineering expertise, supplier knowledge, customer requirements, financial resources, and commercial objectives. Such integration allows automotive firms to prioritise development opportunities more effectively and strengthen the potential value created through product innovation.

The structure of NPD also influences whether firms can transform innovative concepts into successful market outcomes. Iqbal and Suzianti (2021), based on a systematic review of 99 academic studies, identify important considerations for NPD process design, including collaboration, innovation sources, development tools, process characteristics, and continuous improvement. These considerations are particularly significant for automotive suppliers because they frequently operate under resource constraints while meeting demanding requirements from larger manufacturers. Forti et al. (2020) demonstrate that continuity and change within product development activities can influence new product performance, suggesting that firms need to manage both accumulated knowledge and project renewal. Yu et al. (2020) similarly show that resources devoted to new product activities can contribute to innovation performance when effectively converted into development outcomes. Furthermore, Malek et al. (2020) establish that employee motivation and reward structures influence NPD performance, demonstrating the importance of the human dimension of product development. For Malaysian automotive firms, these findings suggest that strategic NPD should combine structured project management with organisational flexibility, employee involvement, and continuous learning. An effective development system can therefore support stronger resource utilisation, reduce unnecessary development risks, improve coordination, and enhance the commercial potential of new automotive products.

2.2 Technological and Digital Capability for Innovation Driven Automotive Development

Technological capability represents a fundamental requirement for moving beyond manufacturing because automotive firms increasingly compete through their ability to understand, integrate, modify, and apply technologies rather than merely operate production facilities. Wad and Govindaraju (2011) identify technological capability as an important factor affecting the development and competitiveness of Malaysia's automotive industry, particularly in relation to industrial upgrading. Kamaruddin and Udin (2009) similarly demonstrate that technology adoption among Malaysian automotive suppliers is shaped by organisational characteristics and

pressures within supply chain relationships. These findings indicate that technology acquisition alone is insufficient to establish innovation capability. Firms require technical knowledge, employee competencies, organisational learning, and suitable management practices to convert technological resources into new product outcomes. Zailani et al. (2015) further demonstrate that organisational initiatives, market demand, and environmental requirements influence innovation adoption within the Malaysian automotive supply chain. Panizzon et al. (2020) similarly identify organisational and strategic determinants that influence firms' abilities to develop products for international markets. Consequently, technological capability should be understood as a dynamic organisational resource that supports product design, engineering improvement, problem solving, and technological learning. Strengthening these capabilities can enable Malaysian automotive firms to participate more substantially in higher value product development instead of concentrating predominantly on manufacturing and assembly activities.

Digitalisation adds another dimension to technological capability by changing how product development knowledge is created, communicated, and applied. Marion and Fixson (2021) explain that digital tools are transforming innovation processes by changing work practices, collaboration, and organisational arrangements in NPD. Pesch et al. (2021) further demonstrate that digital product innovation requires organisations to balance stability and fluidity through appropriate levels of formalisation. Their findings show that formalisation can support digital innovation but becomes less beneficial when it restricts the flexibility required for experimentation and adaptation. Iqbal and Suzianti (2021) also identify technological tools and collaboration as important considerations in contemporary NPD process design. These studies suggest that automotive digitalisation should not be evaluated simply according to the number of technologies implemented. Firms need the capability to integrate digital systems with engineering activities, employee knowledge, supplier relationships, product development routines, and strategic objectives. This requirement is particularly important because automotive products increasingly combine mechanical, electronic, information, and digital technologies. Malaysian automotive manufacturers and suppliers therefore need digital capabilities that improve information exchange, product development coordination, technical learning, and decision making. Effective digital integration can consequently provide an important foundation for faster and more responsive innovation driven automotive development.

2.3 Market Driven Product Innovation and Customer Value Creation

Market knowledge is essential to automotive product development because innovation creates competitive value only when new products address meaningful customer requirements or emerging market opportunities. De Luca and Atuahene Gima (2007) demonstrate that different dimensions of market knowledge and cross functional collaboration can influence product innovation performance. Najafi Tavani et al. (2016) similarly establish that market orientation contributes to new product performance, while absorptive capacity affects the ability of organisations to transform market knowledge into productive outcomes. These findings demonstrate that gathering customer information is insufficient unless firms possess organisational mechanisms for interpreting and applying that knowledge. Sok et al. (2016) further show that product innovation can generate stronger performance when supported by complementary marketing resource capabilities. Purchase and Volery (2020) broaden this perspective by demonstrating that marketing innovation concerns how firms develop and implement new approaches to creating and delivering market value. For automotive firms, these relationships are particularly important because customer purchasing decisions involve combinations of product quality, reliability, functionality, affordability, safety, design, convenience, and perceived value. Malaysian automotive manufacturers and suppliers should therefore integrate market information throughout NPD rather than concentrating customer analysis only at the beginning or end of the development process.

Market orientation should also be combined with proactive innovation because automotive firms cannot achieve long term competitiveness simply by responding to existing customer preferences. Morgan and Anokhin (2020) demonstrate that entrepreneurial orientation and market orientation can jointly influence NPD performance, although organisational and environmental contingencies affect this relationship. This suggests that firms require both responsiveness to current customers and the capability to identify opportunities that customers may not yet recognise clearly. Zhan et al. (2018) demonstrate how big data can support NPD by improving the identification and interpretation of customer needs, illustrating the increasing importance of information based innovation. Quaye and Mensah (2019) further establish a relationship between marketing innovation and sustainable

competitive advantage, reinforcing the strategic importance of connecting product innovation with market value. Sheth and Parvatiyar (2021) similarly argue that sustainable marketing requires firms to move beyond passive market response and contribute actively to shaping future market behaviour. For Malaysia's automotive industry, these perspectives suggest that customer knowledge should be combined with technological forecasting, competitor analysis, environmental considerations, and strategic opportunity identification. Such integration can enable firms to develop automotive products that satisfy existing market requirements while simultaneously creating new forms of value, differentiation, and future market opportunity.

2.4 Organisational Innovation Capability and Sustainable Automotive Competitiveness

Organisational innovation capability provides the foundation that enables firms to transform NPD from an occasional activity into a continuous source of competitive performance. Saunila (2020) demonstrates through a systematic review that innovation capability is multidimensional and involves interconnected organisational factors rather than a single technological competence. This perspective is especially relevant to automotive firms because successful NPD requires coordination among engineering, manufacturing, marketing, purchasing, finance, suppliers, and senior management. Liu et al. (2020) further demonstrate that dynamic capability plays an important role in connecting NPD with sustainable performance, indicating that firms must be capable of adjusting and reconfiguring organisational resources as environmental conditions change. Ferreras Méndez et al. (2021) similarly show that entrepreneurial orientation can strengthen NPD performance through business model innovation, highlighting the importance of complementary organisational mechanisms. Panizzon et al. (2020) also identify strategic and organisational capabilities as important determinants of new product development ability. These studies collectively demonstrate that automotive innovation cannot depend solely on technical departments or research activities. Leadership support, employee capability, organisational learning, cross functional cooperation, external networking, and effective resource allocation are required to transform technological and market knowledge into successful automotive products.

The competitive contribution of innovation capability becomes particularly important when firms seek to progress from manufacturing efficiency towards higher value innovation activities. Zailani et al. (2015) demonstrate within Malaysia's automotive supply chain that innovation adoption can contribute to organisational performance, providing evidence that innovation capability has practical implications beyond product development itself. Wad and Govindaraju (2011) similarly identify industrial upgrading and international competitiveness as important challenges for Malaysia's automotive sector, indicating the need for capabilities that support movement into higher value activities. Mu et al. (2017) show that networking capability can enhance NPD performance, while Yusof et al. (2020) demonstrate that employee motivation can influence development outcomes. Iqbal and Suzianti (2021) additionally emphasise collaboration and continuous improvement as important elements of effective NPD process design. Taken together, these findings suggest that sustainable automotive competitiveness emerges when technological capability, market intelligence, employee knowledge, external relationships, organisational learning, and NPD processes operate as an integrated innovation system. For Malaysian automotive firms, developing this system can strengthen product differentiation, technological learning, development efficiency, customer value, and the capacity to compete through innovation rather than depending predominantly on conventional manufacturing activities.

3. Critical Issues Restricting Innovation Driven New Product Development in Malaysia's Automotive Industry

Malaysia's automotive industry has developed substantial manufacturing and supply chain capabilities, yet the transition from production based activities towards innovation driven product development remains challenging. The literature reviewed earlier indicates that competitive automotive development increasingly depends on the integration of strategic NPD, technological and digital capability, market knowledge, and organisational innovation capability. However, these capabilities are not always developed at the same pace or effectively connected within firms. Wad and Govindaraju (2011) identified technological capability, marketing capability, industrial upgrading, and international competitiveness as continuing concerns in the development of Malaysia's automotive industry. Zailani et al. (2015) further demonstrate that organisational conditions, market demand, and

environmental requirements influence innovation adoption within Malaysian automotive supply chains. More recent NPD research available by 2021 also indicates that product development effectiveness depends on appropriate processes, collaboration, technological tools, and organisational capabilities (Iqbal & Suzianti, 2021; Pesch et al., 2021). Based on these concerns, four critical issues require particular attention: strategic complexity in automotive NPD, technological and digital capability limitations, difficulties in converting market knowledge into valuable innovation, and organisational barriers to sustainable innovation capability.

3.1 Escaping the Manufacturing Mindset in Strategic Automotive NPD

A significant issue facing Malaysia's automotive industry is the difficulty of progressing from manufacturing efficiency towards a stronger strategic product development orientation. Manufacturing capability is important, but competing through innovation requires firms to participate more actively in product conception, design, engineering, technological development, testing, and commercialisation. Wad and Govindaraju (2011) demonstrate that Malaysia's automotive development achieved considerable progress in production, employment, sales, and local content while continuing to experience weaknesses in technological and marketing capabilities and international competitiveness. This situation creates a strategic challenge because firms may become highly capable in production activities without developing equivalent capabilities for creating differentiated products. NPD also requires substantial resource commitments before commercial outcomes are certain, increasing the difficulty of selecting appropriate projects. Iqbal and Suzianti (2021) identify resource constraints, collaboration, innovation sources, development tools, and process design as important concerns affecting NPD, particularly among smaller firms. For automotive suppliers operating within larger manufacturing networks, these difficulties can be particularly important because development priorities may be influenced by customer specifications and supply chain requirements. The central issue is therefore whether firms can transform manufacturing expertise into independent and strategically valuable product development capability.

Strategic NPD also involves tension between maintaining control and allowing sufficient flexibility for experimentation. Automotive product development requires disciplined management because quality, safety, technical requirements, supplier coordination, development cost, and market timing must be controlled throughout the project. However, excessive dependence on formal procedures can restrict the adaptability required when technologies or customer requirements change. Pesch et al. (2021) demonstrate that formalisation can support digital product innovation, but excessive formalisation reduces the benefits associated with flexibility and organisational fluidity. Iqbal and Suzianti (2021) similarly show that NPD processes should consider organisational characteristics, available resources, collaboration, innovation sources, and continuous improvement rather than assuming that one process is appropriate for all firms. This creates a particular challenge for Malaysian automotive firms attempting to move towards innovation driven development. Insufficient control can increase development risk and resource waste, while excessive control can discourage experimentation and slow responses to technological opportunities. Therefore, one of the fundamental issues is achieving an appropriate balance between development discipline and innovation flexibility while firms continue shifting from production centred operations towards strategic product development activities.

3.2 Breaking the Technology and Digital Capability Ceiling

Technological capability represents another major issue because innovation driven automotive development requires more than acquiring advanced machinery, software, or production systems. Firms must possess sufficient internal knowledge to understand, integrate, modify, and apply technology during product development. The assessment by Wad and Govindaraju (2011) identifies technological capability as an important weakness affecting industrial upgrading and competitiveness in Malaysia's automotive sector. This issue becomes increasingly significant as automotive products incorporate more complex technological systems and require closer integration among engineering, manufacturing, information, and market knowledge. Zailani et al. (2015) demonstrate that innovation adoption among Malaysian automotive supply chain firms is influenced by organisational initiatives and external pressures, indicating that technological innovation depends on organisational conditions rather than technology availability alone. Firms that remain highly dependent on externally obtained technologies may develop production capability without achieving equivalent technological learning. Such dependence can restrict their ability to independently design, adapt, or commercialise innovative automotive products. Consequently, the

technological challenge involves not simply obtaining new technologies but developing the knowledge absorption, engineering expertise, employee competence, and learning capability required to convert technological resources into stronger NPD and commercially valuable automotive innovation.

Digitalisation creates an additional capability gap because digital technologies change the organisation of product development as well as the tools used by employees. Marion and Fixson (2021) demonstrate that digital tools transform NPD by changing work activities, collaboration patterns, organisational arrangements, and knowledge exchange. Digital technologies can potentially improve communication, product design, coordination, and information processing, but these benefits depend on employees and organisations possessing suitable complementary capabilities. Pesch et al. (2021) similarly show that digital product innovation requires organisations to combine formalisation with sufficient fluidity, demonstrating that technological systems must operate within appropriate organisational structures. The issue for Malaysian automotive firms is therefore the possibility of creating a gap between digital investment and digital capability. Firms may acquire sophisticated systems without developing employee competencies, information sharing practices, or development routines required to use them strategically. Digitalisation can consequently remain an operational improvement rather than becoming a source of product innovation. For an industry seeking to progress beyond manufacturing, this distinction is important because digital transformation creates competitive value only when digital resources strengthen technological learning, development decisions, collaboration, and the capability to create differentiated automotive products.

3.3 Turning Market Intelligence into Breakthrough Automotive Value

Another critical issue concerns the difficulty of converting customer and market information into automotive products that create meaningful and differentiated value. Automotive manufacturers may collect considerable information about customer preferences, competitor products, pricing, and market trends, yet possessing information does not guarantee that it will influence development decisions effectively. Morgan and Anokhin (2020) demonstrate that market orientation and entrepreneurial orientation influence NPD performance, but the interaction between these strategic orientations is affected by organisational and environmental contingencies. This finding illustrates the complexity of balancing responsiveness to existing customer requirements with the exploration of new market opportunities. An excessive emphasis on existing preferences may encourage minor product improvements rather than more significant innovation, while insufficient customer orientation may result in technically advanced products that lack market relevance. For Malaysian automotive firms, the challenge is intensified by the need to connect market information with engineering decisions, technological capabilities, supplier knowledge, pricing considerations, and commercial strategy. If these knowledge areas remain separated, development teams may produce products that satisfy technical requirements but provide insufficient differentiation or customer value. Market intelligence therefore becomes useful only when organisations possess the capability to interpret information and transform it into meaningful product development priorities.

The market challenge is also changing because automotive value increasingly includes environmental considerations alongside traditional expectations concerning quality, reliability, functionality, affordability, and performance. Zailani et al. (2015) found that market demand and environmental requirements influence green innovation adoption among firms operating within Malaysia's automotive supply chain, demonstrating that innovation decisions are affected by broader external expectations. Masoumi et al. (2019) further show that sustainability in automotive supply chains involves interconnected environmental, economic, and social considerations across multiple supply chain processes. These developments create an important NPD issue because firms must interpret not only present customer requirements but also emerging expectations that can reshape future automotive markets. Market signals can be uncertain, and committing substantial resources to a new product before future demand is established creates considerable commercial risk. Consequently, Malaysian automotive firms face the challenge of balancing immediate customer requirements with longer term innovation opportunities. Failure to anticipate emerging value dimensions may cause firms to remain focused on conventional product characteristics, while moving too quickly towards uncertain opportunities can expose development projects to weak market acceptance and poor investment returns.

3.4 Overcoming Organisational Fragmentation in Building Innovation Capability

The final critical issue involves organisational fragmentation because innovation driven NPD requires multiple capabilities to operate collectively rather than independently. Automotive product development normally involves engineering, manufacturing, marketing, purchasing, finance, suppliers, management, and other specialised functions. Strong performance in individual departments does not necessarily produce successful innovation when knowledge and objectives are poorly integrated across organisational boundaries. Yusof et al., (2020) demonstrates that innovation capability in SMEs is multidimensional and consists of several organisational elements that collectively support innovation activities and performance. This perspective is particularly relevant to automotive firms because development problems can emerge when technological expertise remains separated from customer knowledge or when manufacturing considerations are introduced too late in product development. Innovation capability can also be weakened when specialised knowledge is concentrated among a small number of employees or when management support for experimentation and organisational learning is insufficient. Malaysian automotive suppliers may experience additional difficulties because limited resources can restrict investment in specialised employees and development capabilities. The issue is therefore not simply whether firms possess technical or financial resources. More importantly, competitive NPD depends on whether firms can integrate specialised resources into a coordinated organisational capability that consistently supports knowledge sharing, learning, decision making, and innovation.

Building sustainable innovation capability is further complicated by the need for organisations to continuously adapt their existing routines and resources. Innovation capability cannot remain static because automotive technologies, customer requirements, supply chain relationships, and competitive conditions continue to evolve. Ferreras Méndez et al. (2021) demonstrate that stronger NPD performance depends on complementary organisational mechanisms, including business model innovation, rather than entrepreneurial orientation alone. Saunila (2020) similarly shows that innovation capability should be understood through multiple organisational dimensions, reinforcing the importance of developing organisational systems rather than isolated competencies. For Malaysian automotive firms, this creates a significant challenge because innovation capability requires continuing investment in employee knowledge, leadership, organisational learning, external collaboration, and resource reconfiguration. Zailani et al. (2015) also demonstrate that innovation adoption can influence performance within Malaysia's automotive supply chain, indicating that organisational capability has implications beyond individual development projects. Without stronger integration and continuous learning, firms may remain dependent on individual projects or external technologies. Consequently, moving beyond manufacturing requires innovation capability to become embedded throughout organisational routines and strategic decision making rather than treated as a temporary response to particular market or technological pressures.

4. Strategic Discussion on Advancing Innovation Driven New Product Development in Malaysia's Automotive Industry

The critical issues affecting innovation driven NPD in Malaysia's automotive industry demonstrate that moving beyond conventional manufacturing requires more than adopting advanced technologies or introducing new products. Transformation depends on the ability of automotive manufacturers and suppliers to integrate strategic product development, technological learning, digital capability, customer knowledge, and organisational innovation into a coherent business system. Earlier assessments of Malaysia's automotive sector identified technological capability and international competitiveness as continuing challenges despite substantial development in production activities (Wad & Govindaraju, 2011). Research within the Malaysian automotive supply chain further indicates that organisational initiatives and external market pressures can influence innovation adoption and performance outcomes (Zailani et al., 2015). Contemporary NPD research available by 2021 also emphasises the importance of appropriately designed development processes, digital tools, collaboration, and organisational adaptability (Iqbal & Suzianti, 2021; Marion & Fixson, 2021). These findings indicate that the four issues identified previously are closely interconnected. Accordingly, this discussion considers how Malaysian automotive firms can strengthen strategic NPD orientation, technological and digital

capability, market focused innovation, and integrated organisational capability to support a more innovation driven competitive position.

4.1 Moving from Manufacturing Excellence to Strategic Product Innovation

The transition from manufacturing orientation towards strategic NPD requires Malaysian automotive firms to reconsider how value is created within product development. Manufacturing efficiency remains essential, but long term competitiveness increasingly depends on whether firms can participate actively in opportunity identification, concept creation, engineering development, technological problem solving, and commercialisation. The NPD literature supports this position by demonstrating that successful product development requires processes specifically designed around organisational characteristics, resources, collaboration, innovation sources, tools, and continuous improvement (Iqbal & Suzianti, 2021). For Malaysian automotive manufacturers and suppliers, this implies that manufacturing knowledge should become an input into product innovation rather than the final objective of industrial capability development. Development teams should connect production expertise with market knowledge, engineering capability, supplier knowledge, and strategic priorities. This integration is particularly important because automotive product development involves substantial resource commitments and technical complexity. A manufacturing focused organisation may be capable of producing products efficiently according to existing specifications while remaining less capable of creating distinctive products independently. Strategic NPD therefore provides a mechanism for converting accumulated manufacturing experience into stronger design knowledge, innovation capability, differentiated products, and higher value competitive activities.

However, stronger strategic NPD does not mean creating highly formal development systems that restrict creativity and responsiveness. Automotive development requires substantial discipline because cost, quality, engineering requirements, supplier readiness, market timing, and resource utilisation must be controlled. At the same time, product development teams need flexibility to respond to new technical knowledge, changing customer requirements, and emerging market opportunities. Pesch et al. (2021) demonstrate that formalisation can improve digital product innovation performance and radicalness, although the positive effect decreases as formalisation becomes increasingly extensive. This finding provides an important implication for Malaysian automotive firms. Formal NPD structures should clarify objectives, responsibilities, project stages, evaluation criteria, and resource commitments without preventing teams from experimenting or revising development decisions. Iqbal and Suzianti (2021) similarly highlight continuous improvement and organisationally appropriate process design rather than dependence on a universal NPD structure. Therefore, firms seeking to escape a purely manufacturing mindset should develop adaptive NPD governance. Such governance can provide managerial discipline while allowing technical learning, experimentation, and adjustment, enabling manufacturing capability to evolve progressively into stronger innovation and product development capability.

4.2 Transforming Technology Adoption into Digital Innovation Capability

The technological capability issue indicates that automotive transformation should be evaluated according to what firms can do with technology rather than simply what technologies they possess. Investments in equipment, software, digital platforms, or production systems create limited strategic differentiation when organisations remain dependent on external parties for technological knowledge and product design decisions. Research within Malaysia's automotive supply chain shows that innovation adoption is influenced by internal organisational conditions as well as external market and environmental pressures, demonstrating that technology needs complementary organisational capabilities to produce performance benefits (Zailani et al., 2015). Therefore, Malaysian automotive firms should strengthen technological learning simultaneously with technology acquisition. Engineering knowledge, employee technical skills, problem solving capability, knowledge absorption, supplier collaboration, and internal experimentation are necessary for turning acquired technologies into product innovation. This distinction is important for an industry attempting to move beyond manufacturing because technology ownership can improve production efficiency without necessarily improving independent innovation capability. Technological learning enables firms to understand how technologies can be modified, integrated, and applied to new product opportunities, thereby creating a stronger foundation for automotive design, development, and future industrial upgrading.

Digital capability extends this argument because digital transformation changes not only automotive technologies but also the organisation of innovation work. Marion and Fixson (2021) show that digital tools affect the way NPD employees work, collaborate, communicate, and organise product development activities. Pesch et al. (2021) further demonstrate that digital innovation requires a balance between organisational structure and fluidity, suggesting that digital technology creates stronger outcomes when supported by suitable managerial processes. For Malaysian automotive firms, digitalisation should therefore be embedded in NPD rather than managed independently as an information technology programme. Digital systems can support engineering communication, product design, knowledge exchange, supplier coordination, development monitoring, and market analysis, but employees must possess sufficient capability to interpret and use the information generated. Firms also need organisational routines that allow digital information to move across engineering, manufacturing, marketing, purchasing, and management functions. When these capabilities are absent, digital investment may improve isolated activities without transforming innovation performance. In contrast, integrating technology, people, knowledge, and development routines can convert digitalisation into a strategic capability that strengthens automotive innovation and accelerates the shift towards higher value product development.

4.3 Converting Market Intelligence into Distinctive Automotive Innovation

The market intelligence issue demonstrates that automotive NPD should balance customer responsiveness with proactive opportunity identification. Firms that concentrate exclusively on existing customer requirements may develop commercially relevant products, but such an approach can encourage incremental improvement rather than meaningful differentiation. Conversely, firms that emphasise technological novelty without sufficient market understanding may introduce products that customers perceive as unnecessary or provide insufficient value. Morgan and Anokhin (2020) demonstrate that entrepreneurial orientation and market orientation jointly affect NPD performance, while firm size, technological intensity, and environmental turbulence influence how these orientations interact. This evidence suggests that Malaysian automotive firms require both market responsiveness and entrepreneurial exploration. Customer information should influence product concepts, engineering requirements, design choices, testing, and commercial positioning, but development teams should also investigate emerging technologies and future market opportunities. Market intelligence becomes strategically valuable only when it is translated into specific product decisions. Cross functional interpretation is therefore important because marketing employees, engineers, manufacturing personnel, suppliers, and senior managers may recognise different implications from the same customer information. Combining these perspectives can improve the ability of firms to transform market knowledge into automotive products that provide meaningful customer value and competitive differentiation.

The concept of customer value should also expand as environmental and sustainability considerations become increasingly relevant to automotive competition. Zailani et al. (2015) found that market demand and environmental requirements were among the factors influencing green innovation adoption in Malaysia's automotive supply chain, while their study linked innovation adoption with firm performance. Masoumi et al. (2019) further demonstrate through an automotive supply chain review that sustainability involves interconnected economic, environmental, and social considerations across major business processes. These findings indicate that market intelligence should capture emerging expectations rather than focusing only on conventional product characteristics. Malaysian automotive firms should interpret information concerning quality, affordability, functionality, technological convenience, environmental performance, and broader customer expectations as potential inputs into NPD. However, responding to every emerging trend would create substantial development uncertainty and resource pressure. Firms therefore need strategic screening mechanisms that assess the commercial significance, technological feasibility, and organisational suitability of emerging opportunities. By combining current customer knowledge with technological forecasting and environmental awareness, automotive manufacturers and suppliers can develop more distinctive products while reducing dependence on reactive product development strategies.

4.4 Building an Integrated Innovation System for Sustainable Automotive Competitiveness

The organisational fragmentation issue indicates that innovation capability should be treated as an organisation wide system rather than the responsibility of research, engineering, or product development departments alone. Saunila (2020) identifies innovation capability as a multidimensional concept involving interconnected organisational determinants and innovation outcomes, reinforcing the argument that technical knowledge by itself is insufficient. Automotive NPD requires information and expertise from engineering, manufacturing, marketing, purchasing, finance, suppliers, and management. When these functions operate independently, firms may experience delayed decisions, conflicting objectives, duplicated activities, or products that are technically feasible but commercially unsuitable. Malaysian automotive firms should therefore strengthen cross functional integration and establish common objectives for product development projects. Knowledge generated during customer analysis, engineering development, production planning, supplier interaction, and product testing should be accessible across relevant functions. Leadership also plays an important role by ensuring that innovation receives appropriate resources and that employees are encouraged to exchange knowledge. In this way, innovation capability becomes the organisation's collective capacity to integrate specialised resources into coherent development decisions rather than simply the sum of individual technical competencies.

Sustainable competitiveness further requires this innovation system to evolve continuously as technology, markets, and competitive conditions change. Ferreras Méndez et al. (2021) demonstrate that entrepreneurial orientation positively influences NPD performance and that business model innovation acts as an important complementary mechanism, showing that innovative behaviour requires supporting organisational arrangements to generate stronger outcomes. Saunila (2020) similarly emphasises the multidimensional nature of innovation capability, indicating that firms need to develop several interconnected organisational capabilities rather than concentrating resources on isolated innovation activities. For Malaysian automotive manufacturers and suppliers, continuous innovation capability should therefore involve organisational learning, employee development, external collaboration, knowledge retention, and systematic evaluation of completed NPD projects. Lessons from successful and unsuccessful projects can improve future decisions concerning technologies, customer requirements, suppliers, resource allocation, and commercialisation. External relationships can also provide knowledge that is unavailable internally, but firms should develop mechanisms for absorbing and retaining this knowledge. Ultimately, moving beyond manufacturing requires strategic NPD to become an embedded organisational capability that repeatedly converts technological knowledge, market intelligence, collaborative expertise, and learning into commercially valuable automotive products and sustainable competitive performance..

5. Strategic Suggestions for Accelerating Innovation Driven NPD in Malaysia's Automotive Industry

The transition of Malaysia's automotive industry beyond conventional manufacturing requires coordinated actions that convert existing production strengths into stronger product development and innovation capabilities. The discussion indicates that the major barriers are interconnected and involve an excessive manufacturing orientation, gaps between technology adoption and innovation capability, difficulties in translating market intelligence into distinctive customer value, and organisational fragmentation that restricts continuous innovation. These challenges cannot be addressed effectively through isolated technology investments or occasional new product projects. Instead, Malaysian automotive manufacturers and suppliers need an integrated approach that connects strategic NPD, technological learning, digital capability, customer knowledge, employee development, and organisational collaboration. Iqbal and Suzianti (2021) emphasise that effective NPD requires attention to process design, collaboration, innovation sources, technological tools, and continuous improvement. Marion and Fixson (2021) further demonstrate that digital technologies are changing collaboration and organisational arrangements within product development. Accordingly, four strategic directions are proposed to strengthen innovation driven NPD: developing adaptive product innovation systems, converting technology adoption into internal innovation capability, establishing market intelligence driven product development, and building an integrated organisational innovation ecosystem capable of supporting sustainable automotive competitiveness.

5.1 Creating an Adaptive Product Innovation System Beyond Manufacturing

Malaysian automotive firms should establish an adaptive product innovation system that extends organisational responsibility beyond efficient manufacturing towards the active creation and commercialisation of new product ideas. Such a system should provide clear processes for opportunity identification, idea screening, concept development, technical assessment, testing, production readiness, and market introduction. However, the system should remain sufficiently flexible to respond to changing technologies, customer requirements, and competitive conditions. Iqbal and Suzianti (2021) identify product design, collaboration, innovation sources, process modelling, technological tools, and continuous improvement as important aspects of NPD process design, particularly for firms operating with resource limitations. These findings indicate that Malaysian automotive firms should avoid simply transferring conventional manufacturing control procedures into innovation activities. Product development requires different levels of experimentation, learning, and uncertainty. Firms should establish project teams capable of combining engineering, manufacturing, marketing, purchasing, and financial knowledge from the beginning of development. Clear project objectives and decision criteria can provide strategic discipline, while sufficient autonomy should be given to development teams to revise technical solutions when new information becomes available. This approach can gradually convert accumulated manufacturing expertise into stronger product design, development, and innovation capability.

Regular strategic reviews should also be incorporated throughout automotive NPD to prevent resources from remaining committed to projects with declining technological or commercial potential. These reviews should examine technical feasibility, customer value, development costs, market attractiveness, manufacturing readiness, supplier capability, and consistency with organisational strategy. Pesch et al. (2021) demonstrate that formalisation can improve digital product innovation performance and radicalness, although its positive contribution decreases when formal structures become excessive. This suggests that project governance should provide direction without preventing experimentation and adjustment. Malaysian automotive firms should therefore establish flexible decision points rather than rigid administrative requirements. Development teams should be permitted to modify specifications, change development priorities, or discontinue weak projects when reliable evidence indicates that expected outcomes are unlikely to be achieved. Completed projects should also undergo systematic review so that knowledge concerning technical problems, supplier coordination, customer response, project delays, and commercial outcomes can support future NPD activities. Iqbal and Suzianti (2021) specifically identify continuous improvement as an important consideration within NPD process design. Through systematic learning and adaptable governance, automotive firms can progressively move from manufacturing execution towards stronger strategic product innovation.

5.2 Converting Technology Adoption into Internal Digital Innovation Capability

Automotive firms should shift their focus from acquiring technologies towards developing the internal capability to understand, integrate, modify, and exploit those technologies for product innovation. Technology investment can strengthen production efficiency, but it creates limited strategic differentiation when employees remain dependent on external technology providers for design, engineering, and development knowledge. Digital capability therefore requires simultaneous investment in employee competencies, technical learning, knowledge absorption, and organisational routines. Marion and Fixson (2021) demonstrate that digital technologies are transforming not only NPD tools but also patterns of work, collaboration, and organisational coordination. Malaysian automotive firms should consequently conduct capability assessments before major technological investments to determine whether employees possess the engineering, digital, analytical, and problem solving skills required to use new systems effectively. Training should be linked directly to actual product development activities rather than delivered as isolated technical instruction. Development employees should also be encouraged to document and share technological knowledge obtained from suppliers, technology partners, and previous projects. This approach can improve organisational learning and reduce long term dependence on externally controlled technological expertise. Building internal technological competence therefore represents an important step in transforming technology adoption into a sustainable source of automotive innovation.

Digital systems should also be integrated directly into product development processes rather than treated mainly as supporting information technology infrastructure. Pesch et al. (2021) show that successful digital product innovation depends on an appropriate combination of formal structures and organisational fluidity. Malaysian automotive firms can therefore create multidisciplinary digital innovation teams that include engineering, manufacturing, marketing, information technology, and management personnel. These teams can initially apply digital tools to clearly identified NPD problems, such as inefficient engineering communication, slow product modifications, weak information exchange, or limited coordination with suppliers. Small scale implementation allows firms to determine whether new digital systems provide meaningful development benefits before broader investment is undertaken. Marion and Fixson (2021) further indicate that digital tools alter collaboration and organisational relationships within NPD, reinforcing the need to address managerial practices alongside technology implementation. Firms should consequently develop shared digital information environments where relevant technical and market information can be accessed across functions. Through employee development, experimentation, knowledge sharing, and strategic technology selection, digitalisation can become an internal innovation capability that strengthens product development rather than simply an additional operational technology.

5.3 Establishing a Market Intelligence Driven Automotive Innovation Process

Malaysian automotive firms should develop a structured market intelligence system that connects customer information directly with product development decisions. Market information should be collected continuously rather than only during initial market research or after product introduction. Development teams need timely knowledge concerning customer problems, purchasing priorities, competitor products, technological trends, environmental expectations, and changes in market behaviour. Morgan and Anokhin (2020) demonstrate that entrepreneurial orientation and market orientation can jointly influence NPD performance and that firm and environmental conditions affect this relationship. This suggests that Malaysian automotive firms should combine responsiveness to established customer requirements with proactive exploration of new opportunities. Cross functional market intelligence teams can provide an effective mechanism for achieving this balance. Such teams should involve marketing, engineering, manufacturing, sales, suppliers, and strategic management so that market information is evaluated from different organisational perspectives. Customer expectations can then be translated into specific product priorities involving functionality, reliability, quality, affordability, convenience, and other relevant dimensions. Integrating market intelligence throughout concept development, technical design, testing, and commercialisation can reduce the possibility that firms invest heavily in products that perform technically but create insufficient customer or competitive value.

Market intelligence should also support future oriented innovation rather than merely reproduce current customer preferences. Firms seeking stronger automotive competitiveness need to identify changes in technology, customer behaviour, sustainability expectations, and competitive positioning before these developments become established market requirements. Morgan and Anokhin (2020) show that market orientation and entrepreneurial orientation can complement one another within NPD, indicating that customer knowledge should operate alongside opportunity seeking behaviour. Malaysian automotive firms can support this process through systematic competitor analysis, customer feedback, technology scanning, supplier information, and early product concept testing. Market information should then be evaluated using clear criteria involving potential customer value, strategic relevance, technological feasibility, resource requirements, and expected differentiation. This process can help organisations avoid reacting to every short term market signal while ensuring that potentially significant opportunities are not ignored. The objective should be to transform market intelligence into development knowledge that enables firms to create distinctive automotive value. Through stronger integration between customer understanding, engineering expertise, technological forecasting, and strategic decision making, Malaysian automotive companies can move from reactive product improvement towards more proactive and innovation driven NPD.

5.4 Building an Integrated Automotive Innovation Ecosystem for Sustainable Competitiveness

Malaysia's automotive firms should establish innovation capability as an organisation wide system rather than assigning innovation primarily to engineering or research functions. New automotive products require coordinated knowledge from engineering, manufacturing, marketing, finance, purchasing, suppliers, management, and external technology partners. Organisational structures should therefore encourage these different functions to participate throughout the NPD process. Cross functional teams can improve early identification of technical, manufacturing, market, and financial concerns while reducing costly modifications at later development stages. Firms should establish shared innovation objectives so that departments do not evaluate product development solely according to their individual functional targets. Employee knowledge should also be treated as an organisational resource that needs to be retained and transferred across development projects. Marion and Fixson (2021) demonstrate that contemporary innovation increasingly changes how employees and organisational units collaborate, reinforcing the importance of organisational integration within NPD. Management should therefore create regular mechanisms for knowledge exchange, project learning, and joint problem solving. Such integration can transform specialised expertise into a collective innovation capability and reduce organisational fragmentation that restricts product development performance.

The innovation system should also extend beyond individual organisational boundaries through carefully selected external collaboration. Malaysian automotive manufacturers and suppliers may not possess every technological or research capability internally, making collaboration with suppliers, technology partners, research institutions, and universities potentially valuable. However, external collaboration should contribute to internal capability development rather than create permanent knowledge dependence. Firms should identify specific knowledge gaps before establishing partnerships and ensure that employees participate directly in collaborative development activities. Iqbal and Suzianti (2021) identify collaboration and external innovation sources as important components of effective NPD process design. Organisations should also systematically evaluate completed projects according to development efficiency, technological learning, customer acceptance, product quality, commercial performance, and capability improvement. Knowledge from successful and unsuccessful projects should then be incorporated into future product development decisions. Continuous learning is essential because automotive technologies and competitive requirements continue to change. By integrating internal collaboration, external knowledge, employee development, and performance evaluation, Malaysian automotive firms can establish a sustainable innovation ecosystem. Such an ecosystem can support repeated product innovation, strengthen technological independence, improve market responsiveness, and progressively shift the industry from manufacturing based competition towards higher value innovation driven competitiveness.

6. Conclusion

Malaysia's automotive industry has developed a strong manufacturing foundation, supported by established production capabilities, supplier networks, technological adoption, and industrial experience. However, the analysis in this article demonstrates that manufacturing strength alone is insufficient to secure sustainable competitiveness in an increasingly innovation driven automotive environment. The future development of the industry depends on its ability to transform manufacturing knowledge into stronger capabilities for new product development, technological learning, digital innovation, and market value creation. This transition requires NPD to be positioned as a strategic organisational capability rather than being limited to engineering or production activities. As discussed throughout the article, effective automotive NPD requires the integration of technological knowledge, customer insights, organisational resources, employee competencies, supplier involvement, and strategic decision making. This integrated perspective is consistent with the central argument of the article that Malaysian automotive firms need to progress beyond conventional manufacturing towards higher value product development and innovation activities.

The analysis also demonstrates that several interconnected challenges can restrict this transformation. Malaysian automotive manufacturers and suppliers need to overcome a manufacturing centred mindset, strengthen

technological and digital capabilities, improve the conversion of market intelligence into meaningful product innovation, and reduce organisational fragmentation. These challenges should not be addressed independently because successful innovation emerges from the interaction between multiple organisational capabilities. Technology investment, for example, will provide limited innovation value without appropriate employee knowledge, organisational learning, information sharing, and product development processes. Similarly, market information becomes valuable only when it can be translated into product concepts and development priorities that respond to customer expectations and emerging market opportunities. The article therefore emphasises the importance of balancing structured NPD processes with sufficient flexibility for experimentation and adaptation. Building stronger connections among engineering, manufacturing, marketing, suppliers, management, and other organisational functions can further improve the ability of firms to transform knowledge and resources into commercially valuable automotive products.

Moving forward, Malaysian automotive firms should develop an integrated innovation system that combines adaptive NPD processes, internal technological and digital capability, market intelligence, cross functional collaboration, and continuous organisational learning. Greater emphasis should be placed on developing internal knowledge and employee capabilities rather than depending primarily on technology acquisition. At the same time, customer and market intelligence should be incorporated throughout product development so that technological advancement produces products with clear commercial relevance and differentiated customer value. Collaboration with suppliers, technology partners, research institutions, and other external parties can further strengthen access to knowledge, provided that external collaboration contributes to the development of internal organisational capability. Through these efforts, Malaysian automotive manufacturers and suppliers can progressively strengthen their ability to generate, develop, and commercialise innovative products while improving their responsiveness to technological and market changes.

Ultimately, moving beyond manufacturing represents a strategic progression rather than the abandonment of Malaysia's existing industrial strengths. Manufacturing capability should provide the foundation upon which stronger innovation capabilities are developed. By integrating production expertise with strategic NPD, technological learning, digital capability, market knowledge, and organisational innovation, Malaysia's automotive industry can strengthen product differentiation and create greater value from its existing industrial base. The long term competitiveness of the industry will therefore depend not only on how efficiently automotive products are manufactured, but also on how effectively firms can transform knowledge, technologies, market opportunities, and organisational capabilities into successful new products. An innovation driven NPD orientation can consequently provide an important pathway for Malaysia's automotive industry to advance towards higher value activities, stronger technological capability, improved market competitiveness, and more sustainable industrial development.

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