

Digital–Sustainability integration in UK Housebuilding: A Taylor Wimpey Case Study

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Declaration

I, Andrei Binzari declare that this dissertation has been composed by myself, that the work contained herein is entirely my own except where explicitly stated otherwise in the text, and that this work has not been submitted for any other degree or qualification, in whole or in part, except as specified.

Signature: *Andrei Binzari*

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Chapter 1: Introduction

1.1 Introduction

The UK housebuilding sector is being reshaped by two concurrent forces: the rapid diffusion of digital technologies and tightening planning and environmental and planning requirements (Page, et al., 2021). To explain how these dynamics, interact in practice, this dissertation work undertakes a systematic literature review (SLR) of evidence published between 2020 and 2025.

On the regulatory side, Biodiversity Net Gain (BNG) is now a statutory planning condition in England, requiring most developments to deliver a minimum 10% measured net gain and to secure it for the long term (Environment_Act-2021, 2021). In parallel, government is introducing the Home Energy Model (HEM) as the compliance methodology aligned to the Future Homes Standard (FHS) for new dwellings, signalling a shift to more transparent, model-based energy assessments from 2025 (Department for Energy Security & Net Zero, 2025). These frameworks raise the evidential burden on developers and make auditable information management central to planning and delivery (GOV.UK, 2024).

Taylor Wimpey plc is one of the UK's largest residential developers, operating across England, Scotland, and Wales. The company designs, builds, and sells a wide range of homes, focusing on quality, sustainability, and community value (RECOUP, 2025). Headquartered in High Wycombe, it employs over 5,000 people and is listed on the London Stock Exchange.

While Taylor Wimpey will be referenced as an exemplar (case study) to illustrate sector practice, the unit of analysis is the UK volume housebuilding sector. Framing the study as an SLR enables a transparent and reproducible approach to identifying, appraising and synthesising both academic and reputable industry evidence. The goal is to build an evidence-based account of how digital and sustainability workflows are combined in practice, why particular choices are made (for example, to de-risk planning or improve carbon performance), and with what effects on outcomes such as planning timelines and conditions, BNG unit delivery and monitoring, and operational and embodied carbon metrics. By clarifying what works, for whom, and under what conditions, the dissertation aims to inform both practitioners and policymakers seeking effective, scalable pathways to deliver compliant, low-carbon, nature-positive housing at pace.

1.2 Background

This dissertation looks at the UK volume housebuilding sector between 2020 and 2025. It asks how digital ways of working are combined with sustainability practices to meet planning and environmental rules in England. The planning context is set by the National Planning Policy Framework (NPPF), which was updated in December 2024 and amended in February 2025.

These updates guide how local plans are made and how decisions are taken and therefore shape the evidence developers must provide (DLUHC Department for Levelling Up, 2024).

Two policy changes are especially important. First, biodiversity net gain is now required for most developments in England. Schemes must deliver at least a 10% increase in biodiversity and secure it for the long term. This became mandatory for major developments on 12 February 2024 and for minor developments on 2 April 2024. It affects how sites are surveyed, how designs evolve, and how on-site or off-site habitat units are managed and monitored (DEFRA/GOV.UK, 2023). Second, government is moving from the familiar SAP energy assessment to the new Home Energy Model, which will sit behind the Future Homes Standard for new homes. The government response published in 2025 confirms the role and approach of the Home Energy Model. This shift raises the need for clear product and asset data so that energy performance claims can be evidenced (Department for Energy Security & Net Zero, 2025).

Within this policy setting, the study keeps a tight focus on the digital and sustainability practices that directly support compliance. It considers how building information modelling and common data environments help coordinate design and construction and provide an audit trail for planning conditions. It looks at how mapping and ecology workflows support habitat baselining, design changes, unit calculations and monitoring for biodiversity net gain. It also looks at how design models feed into life cycle assessment for embodied carbon and into energy assessment tools—using SAP in the old regime and the Home Energy Model going forward—to show readiness for the Future Homes Standard (Department for Levelling Up Housing & Communities, 2024)

Taylor Wimpey will be used as an example to illustrate current industry practice, but also the unit of analysis will be the wider UK housebuilding sector. By narrowing the scope to these workflows and policies, the dissertation aims to produce clear, evidence-based insights about what works, for whom, and under what conditions in mainstream residential development.

1.3 Research Aim

The aim of this dissertation is to explain how digital ways of working and sustainability practices are combined in UK volume housebuilding (2020–2025) to meet planning and environmental requirements, and what effects this has on delivery, environmental, and customer outcomes. The study focuses on the role of information management (clear roles, exchange information requirements, and common data environments) and leadership/change routines in turning tools and policies into measurable results. Taylor Wimpey is used as an illustrative example where helpful, also the unit of analysis is the wider UK sector.

In practical terms, the study seeks to:

- identify which digital–sustainability workflows are most often used to satisfy BNG and Future Homes expectations;

- examine how organisational capability shapes the size and reliability of the benefits;
- gather and synthesise outcome evidence to clarify what works, for whom, and under what conditions.
- develop evidence-based recommendations for improving the integration of digital tools and sustainability strategies within Taylor Wimpey and the wider UK housebuilding industry.

1.4 Research Objectives

To turn the aim into clear, workable steps, the study sets out the objectives below. They focus on what is actually done in UK housebuilding, how rules shape choices, what results are reported, and what enables or blocks progress. The research objectives are:

1. To analyse the current policy and regulatory context influencing sustainability and digital transformation in UK housebuilding between 2020 and 2025;
2. To evaluate how Taylor Wimpey has implemented digital and sustainability initiatives between 2019 and 2024, and how these have influenced environmental and operational performance.
3. To identify the main enablers and barriers affecting the integration of digital tools and sustainability practices in large UK house builders.
4. To develop evidence-based recommendations for improving digital–sustainability integration and achieving long-term Net Zero and ESG goals in the UK housing sector.

1.5 Research Questions

To keep the study focused and testable, the review is guided by the questions below. They follow directly from the aim and objectives: first, to understand which digital–sustainability workflows are actually used in UK volume housebuilding (2020–2025); second, to see how planning and environmental rules shape choices; and third, to examine what outcomes are reported and what enables or blocks progress. The research questions are presented below:

1. How do national sustainability and housing policies (2020–2025) influence the adoption of digital innovation and environmental practices in the UK housebuilding sector?
2. How has Taylor Wimpey implemented digital technologies and sustainability initiatives between 2019 and 2024, and what measurable outcomes have resulted from these actions?
3. What are the main challenges and enablers affecting the integration of digital transformation and sustainability across large UK house builders?
4. What recommendations can be developed to enhance the integration of digital and sustainability strategies within Taylor Wimpey and the wider UK housing industry?

Together, these questions move from description (what workflows exist) to explanation (how rules and organisational capability shape them) and finally to evaluation (what outcomes are achieved and what can be replicated). They also ensure that the review does not stop at tool adoption, but tests whether information management, leadership and supply-chain practices make a measurable difference - and identifies where the evidence is strong, mixed, or still missing.

1.6 Chapter Summary

This chapter set the scene for the dissertation and defined its scope. It focused on the UK volume housebuilding sector between 2020 and 2025, with Taylor Wimpey used only as an example where helpful. It explained why planning policy and environmental rules matter—most notably the updated National Planning Policy Framework, statutory biodiversity net gain (10% minimum), and the move to the Home Energy Model for the Future Homes Standard.

The chapter then stated the research aim, set clear objectives, and posed research questions that link digital ways of working and sustainability practices to outcomes that matter in practice - planning timelines and conditions, biodiversity unit delivery and monitoring, operational and embodied carbon, delivery performance, and customer outcomes. Chapter 2 now reviews the academic and industry literature and develops the conceptual framework and hypotheses. Chapter 3 describes the review method (protocol, sources, screening, appraisal, and synthesis).

Chapter 2: Literature Review

2.1 Introduction

This chapter reviews what recent evidence says about how digital ways of working and sustainability practices are combined in UK housebuilding, and what results they deliver. It brings together four strands: *construction digitalisation* - often linked to better communication and fewer errors (Bryde, et al., 2013), but with benefits that depend on governance and capability (Whyte & Lobo, 2010); *sustainability methods*, including life-cycle assessment and post-occupancy evaluation, which argue for whole-life thinking and verification in use (Pomponi & Moncaster, 2017), (United Nations Environment Programme, 2020); *organisation and change*, because scaling new routines is as much a leadership and information-management task as a technical one; and *regulation*, which now pushes practice through biodiversity net gain and the Future Homes/HEM transition (Department for Energy Security & Net Zero, 2025).

To keep the discussion grounded, the chapter also uses Taylor Wimpey disclosures as sector evidence (for example, targets on carbon and nature, timber frame expansion, supplier engagement and data/reporting practices). These reports signal intent and list programmes under way, but they are not the same as independent, portfolio-level evaluations of measured outcomes (Wimpey, 2024). That gap matters because current policy raises the evidential bar: BNG requires a minimum 10% net gain with monitoring and security in place, and the Home Energy Model will underpin compliance for new homes under the Future Homes Standard (Department for Levelling Up Housing & Communities, 2024).

Accordingly, this chapter maps what is known, where studies agree or disagree, and where evidence is thin—especially around causal links, post-occupancy results, and the information-management conditions needed to repeat success at scale. These insights lead directly to the conceptual framework and research questions that guide the rest of the dissertation.

2.2 Key concepts & theories

Digital transformation in construction means the planned use of Building Information Modelling (BIM), data/AI analytics, robotics, and connected site tools to change how projects are designed and delivered. The key concepts and theories are presented in figure 1.

Digital transformation in construction means the planned use of Building Information Modelling (BIM), data/AI analytics, robotics, and connected site tools to change how projects are designed and delivered. Studies link BIM to clearer information, fewer clashes, and better cost/schedule control, but gains vary with implementation maturity (Bryde, et al., 2013). Robotics shows promise for repetitive or hazardous tasks, yet adoption is uneven because of capital, safety, and skills

constraints; benefits concentrate where capability and integration are stronger (Oesterreich & Teuteberg, 2016).

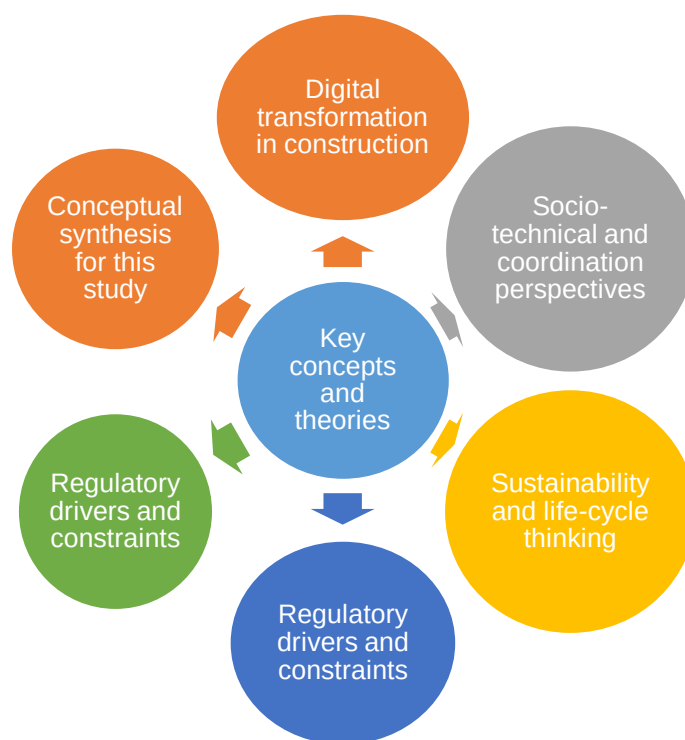


Figure 1. Key concepts and theories

Construction projects are temporary, multi-firm systems, so technology effects depend on social arrangements. Harty characterises innovation as a socio-technical process in which people, routines, and tools co-evolve; identical technologies can yield different outcomes if roles and practices differ (Harty, 2005). Whyte and Lobo show how “digital objects and infrastructures”—shared models, standards and common data environments—enable coordination and control across organisational boundaries (Whyte & Lobo, 2010). These views explain why capability building (standards, training, governance) is as important as software.

Sustainability spans carbon, resource efficiency, biodiversity, and social value. Because buildings drive significant energy use and emissions, credible practice requires whole-life framing—from materials to use and end-of-life (GlobalABC, 2025). UK developers increasingly use assessment frameworks and life-cycle assessment (LCA) to structure evidence; circular-economy principles (designing out waste, keeping materials in use) offer practical routes to reduce embodied impacts (Pomponi & Moncaster, 2017).

Regulation sets the floor and can catalyse change. In England, biodiversity net gain under the Environment Act requires a measured minimum uplift, while the Future Homes Standard and the Home Energy Model tighten energy assessment for new homes (Environment_Act-2021, 2021). Policy also positions digitalisation as a productivity lever (GOV.UK, 2018). Yet rules can add

compliance burden and timing risk, so outcomes depend on organisational capacity to evidence performance.

Turning digital and sustainability investments into results is a change problem as much as a technical one. Kotter's model emphasises urgency, coalitions, vision, short-term wins, and anchoring behaviours (Kotter, 1995). Loosemore highlights risk-aware leadership and learning routines to convert one-off pilots into repeatable capability (Loosemore, 2013).

The review views performance as emerging from the interaction of: digital capabilities and shared information infrastructures, life-cycle sustainability practices and leadership-driven change, all shaped by the regulatory context. This integrated lens guides the variables and propositions tested later.

2.3 Digital–Sustainability in construction

Research on digitalisation in construction, particularly in the UK, shows that Building Information Modelling (BIM) improves coordination, reduces rework, and supports cost and schedule control. However, these benefits are not automatic. Early studies found that while firms recognised BIM's value, they faced barriers such as skills gaps, unclear processes, contract misalignment and resistance to change (Eadie, et al., 2013; Eadie, et al., 2015). BIM is not simply software but a way of working that depends on defined roles, responsibilities and information requirements. Organisations move through stages of capability in people, processes and technologies, and the same tools perform differently depending on that maturity (Succar, 2009). In UK housing projects, benefits such as clash detection and 4D/5D planning remain fragile if information is not well controlled across the supply chain (Georgiadou, 2019).

Wider research on digital transformation notes that construction has lagged other sectors but is now under pressure to adopt Industry 4.0 approaches such as sensors, real-time data platforms and automation. Performance gains come not from a single tool but from a combination of technology, process change and clear responsibilities. The benefits are therefore socio-technical: if contracts, governance and data management remain unchanged, technology alone delivers limited value (Oesterreich & Teuteberg, 2016). This aligns with evidence from large UK house builders, which report investing in both digital tools and process standardisation to make these systems effective at scale (Wimpey, 2023; Wimpey, 2024).

Within this shift, artificial intelligence (AI) and data analytics are among the fastest-growing fields. Studies show strong development in computer vision for site safety and quality checks (Darko, et al., 2020), predictive analytics for cost and schedule risk, and automated progress tracking from imagery and sensors (Pan & Zhang, 2021). Many of these tools now exist as pilots rather than purely academic concepts. Reported benefits include earlier defect detection and improved schedule forecasting. However, AI relies on clean, structured and reliable data, and

many firms still lack consistent data standards, clear ownership and internal expertise to manage and interpret models effectively (Egwim, et al., 2023).

Three key shifts now shape UK housebuilding. First, robotics and automation are evolving from single-task machines (e.g., bricklaying, layout marking) to flexible systems that work alongside people on live sites (Bock, 2015). The aim is higher productivity, repeatability and safety, but adoption remains difficult due to cost and the variability of construction sites. These technologies are more feasible for large firms with standardised house types and repeatable details (Parascho, 2023), a pattern evident in UK volume housebuilding (Wimpey, 2023; Wimpey, 2024).

Second, across BIM, AI and robotics, information management is identified as the main enabler. Standards aligned with BS EN ISO 19650 and the UK BIM Framework define roles, Exchange Information Requirements, approval codes and Common Data Environment workflows, ensuring consistent creation and sharing of project data (OBE, 2020). If information is controlled and traceable, coordination improves and risks fall; if data are incomplete or unmanaged, expected digital benefits are lost. Digital capability therefore depends on governance and organisational discipline as much as technology. Five trends that will shape construction and capital projects are presented in figure 2 (Graphics, 2022).

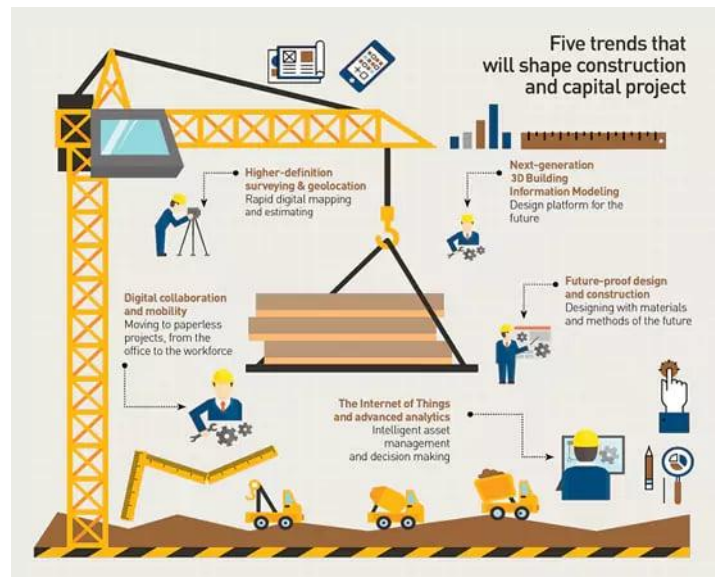


Figure 2. Five trends that will shape construction and capital projects

Third, sustainability practice has shifted from general “green” claims to measurable life-cycle performance. Life Cycle Assessment (LCA) is now used to assess embodied impacts and compare design options, linking to circular-economy principles such as designing for disassembly and reducing waste (Pomponi & Moncaster, 2017). Yet in housing, most evidence remains project-based rather than portfolio-wide, making it difficult to demonstrate consistent performance

(Georgiadou, 2019). A related challenge is the energy performance gap - new homes often use more energy in practice than predicted due to thermal bridges, poor airtightness and occupant behaviour (Wilde & Jones, 2014; Cozza et al., 2019). Post-occupancy evaluation and in-use monitoring are now promoted to close this gap and feed lessons back into design and supply chains (Hay et al., 2017; Li et al., 2022). Major house builders now treat fabric efficiency and in-use energy as part of long-term strategy, not just compliance (Wimpey, 2023; Wimpey, 2024).

Overall, the literature highlights three recurring themes: digital tools can deliver value only when supported by disciplined information management and skilled teams; sustainability claims must be verified through measurable, life-cycle performance; and firms that generate clean, auditable data are best positioned to meet tightening regulations and gain competitive advantage.

2.4 Previous methods used

Research on digital adoption, sustainability performance and regulatory compliance in UK housebuilding relies on a number of core methods. These aim to capture both what firms say they are doing and what projects actually deliver in terms of cost, carbon, biodiversity and in-use performance.

Surveys are commonly used to assess adoption of digital tools such as BIM. Large UK questionnaire studies link BIM uptake to skills, contract structures, information sharing and organisational culture (Eadie et al., 2013; Eadie et al., 2015). They are useful for gathering views from many organisations, but mainly reflect perceptions and self-reported benefits. To explore relationships more deeply, some studies apply structural equation modelling (SEM), often PLS-SEM, to test how internal capabilities such as leadership support, standards, training and data quality relate to reported outcomes like programme reliability or cost control (Hair et al., 2018; Kineber et al., 2023). SEM can model indirect chains such as “better information management → better coordination → better delivery”, but most datasets rely on the same respondents rating both capability and results, which limits causal strength.

Because construction research is fragmented across digital, sustainability and regulation, many authors begin with a systematic literature review (SLR), typically reported using PRISMA 2020. SLRs map themes such as Industry 4.0 in construction (Oesterreich & Teuteberg, 2016) or use of Life Cycle Assessment (LCA) for embodied and whole-life carbon in buildings (Nwodo & Anumba, 2019). Some add bibliometric mapping to cluster topics and identify growing research fronts (Eck & Waltman, 2010). These approaches are strong for identifying trends and gaps but depend on published evidence, which is often based on pilots and short timeframes rather than long-term portfolio performance.

Case studies remain essential because they show how processes work in live organisations. Typical studies combine interviews, internal documents, site observations and performance records to explain how information was managed, how the supply chain responded, and how planning or biodiversity requirements were met (Yin, 2018). This is particularly relevant for emerging topics in UK housebuilding such as common data environments, biodiversity net gain workflows and Future Homes / Home Energy Model readiness. Action research goes further, with the researcher helping implement change (e.g. a new information-management workflow) and studying the outcome. This offers rich practical insight but may not generalise to all developers.

Given the “performance gap” between modelled and actual energy use, housing research increasingly measures in-use outcomes. Methods include post-occupancy evaluation (POE), airtightness tests, co-heating tests, energy monitoring and resident surveys about comfort and control (Gupta, et al., 2018). These provide strong evidence of delivered performance but are costly and disruptive, so samples remain relatively small. To narrow the gap earlier in the process, design teams use methods such as CIBSE TM54 to estimate more realistic operational energy before construction.

For embodied and whole-life carbon, many studies apply building LCA in line with EN 15978, which defines life-cycle stages and boundaries (Nwodo & Anumba, 2019). LCA supports material choices and ESG reporting, but results depend heavily on product data and assumptions. Alongside this, information-management standards such as ISO 19650 are increasingly treated as part of the method itself. Exchange Information Requirements, responsibility matrices and Common Data Environment workflows create auditable data trails that are now central to evidencing compliance on biodiversity net gain, Future Homes and carbon claims.

Across these methods, a consistent message emerges: robust evidence requires both qualitative insight into how digital and sustainability practices are embedded, and quantitative, outcome-based measures such as embodied and operational carbon, biodiversity delivery and post-occupancy performance.

2.5 Enablers, barriers & gaps

The literature shows that digital and sustainability gains are strongest when firms build structured information-management capability, not just when they buy tools. In the UK, guidance aligned with BS EN ISO 19650 defines roles, Exchange Information Requirements (EIRs), status codes and Common Data Environment (CDE) workflows, creating shared rules for how information is created, checked and reused across the asset life cycle. Clear ownership and auditable trails reduce rework, support coordination and provide evidence for planning, carbon, biodiversity and Future Homes / Home Energy Model compliance. Maturity models such as Succar's BIM Framework stress staged development of people, processes and technology rather

than “tool-first” roll-outs (Succar, 2009). On the sustainability side, post-occupancy evaluation (POE) and in-use testing act as feedback loops, turning design intent into measured performance, particularly for energy and fabric quality (Hay, et al., 2017).

Despite strong policy pressure, adoption remains uneven across UK housebuilding. Surveys consistently report skills gaps, cultural resistance, weak supplier buy-in and unclear returns on investment, especially for SMEs. Industry 4.0 reviews argue that without changes to contracts, responsibilities and data ownership, digital tools struggle to deliver value because liability remains unclear (Oesterreich & Teuteberg, 2016). Even where BIM is present, poor information governance - missing EIRs, inconsistent status codes, ad-hoc CDEs - can recreate old silos in digital form. On the sustainability side, the energy performance gap remains a credibility problem: many new homes use more energy in practice than predicted, due to workmanship, commissioning issues and occupant behaviour (Wilde & Jones, 2014). POE highlights these gaps but is resource-intensive and rarely applied portfolio-wide.

Three evidence gaps recur, first, causality at scale: most studies report perceived benefits or single “good” projects; few use multi-project comparisons to isolate how BIM maturity, information management or POE affect cost, programme, defects or carbon (Succar, 2009). Second, a gap from compliance to outcomes: sustainability reporting often focuses on tools and certifications rather than monitored energy-in-use or EN 15978 embodied-carbon modules. Third, delivery capacity under new regulation: policies such as biodiversity net gain (BNG) and the Future Homes / Home Energy Model demand traceable data, yet many organisations and supply chains are not consistently structured to generate and govern that evidence (Britain, 2025).

Overall, competitive advantage for large UK house builders appears less about individual digital tools and more about institutionalising information quality (ISO 19650 discipline, CDE governance, EIR clarity) and closing the loop through POE-driven learning.

2.6 Conceptual framework

This study brings together four core elements: digital capability, information-management (IM) capability, life-cycle sustainability practices, and leadership/change – to explain outcomes in UK volume housebuilding. It focuses on three outcome areas:

- delivery outcomes – cost and schedule variance, rework and defects;
- environmental outcomes – operational energy in use and embodied carbon (EN 15978 life-cycle modules);
- customer outcomes – post-occupancy issues and satisfaction, including comfort, overheating and usability.

Digital Capability refers to the extent to which the organisation uses BIM, data/AI analytics and selective automation across design, construction and handover. Prior studies suggest these tools

can improve coordination, clash reduction and 4D/5D planning, but gains depend on organisational maturity rather than simple tool adoption. Here, Digital Capability is treated as a necessary input, but not sufficient on its own.

Information-Management Capability is modelled as a moderator that strengthens the effect of Digital Capability on outcomes. It covers alignment with BS EN ISO 19650: clear roles, defined Exchange Information Requirements (EIRs), controlled status codes and disciplined Common Data Environment (CDE) workflows. Where information states, ownership and approvals are explicit, digital tools are more likely to deliver better delivery outcomes, auditable carbon data and clearer customer information. Where IM is weak, the same tools underperform.

Leadership and Change Management is modelled as a mediator. Kotter's change theory argues that visible sponsorship, urgency, coalition-building and reinforcement are required to embed new routines (Kotter, 1995). Leadership therefore converts strategic intent ("we will be digital/sustainable/compliant") into actual Digital and IM capability; without it, initiatives stall at pilot stage.

Life-cycle Sustainability Practices include embodied-carbon assessment using LCA to EN 15978 and operational performance assessment using POE, airtightness tests, co-heating tests and in-use energy monitoring (Hay, et al., 2017). These practices predict environmental outcomes and create a feedback loop: measured results inform design guides, product choices, supplier requirements and even EIRs, gradually improving IM quality and digital workflows.

Because housebuilding depends on extended supply chains, Supply-chain Integration is introduced as an additional mediator. It includes subcontractor on boarding to shared standards, contractual IM clauses and enforced CDE use. Work on "digital objects and infrastructures" shows that shared models and structured data environments create cross-organisational coordination and accountability in temporary project coalitions (Whyte & Lobo, 2010).

Finally, Regulatory Pressure (e.g. biodiversity net gain, Future Homes / Home Energy Model) is treated as an external driver. It pushes firms to adopt sustainability practices and tighten IM discipline, but the framework assumes regulation improves outcomes mainly where IM capability is already strong.

From this, the study proposes that:

- IM capability positively moderates the link between digital capability and delivery, environmental and customer outcomes;
- Leadership and change mediate the path from strategic intent to realised capability;
- Regulatory pressure has greater positive effect where IM capability is high;
- Supply-chain integration carries these effects into live projects;

- POE and LCA create a learning loop that continually sharpens standards, designs and information requirements.

2.7 Conclusion

This chapter has shown that digital tools alone are not enough. Studies on BIM, AI and automation report coordination and productivity gains only when supported by clear information-management (IM) arrangements - roles, Exchange Information Requirements and disciplined Common Data Environments as defined in UK ISO 19650 guidance. Sustainability research adds a second message: because UK homes often perform worse in use than at design stage, outcomes must be measured using life-cycle assessment for embodied carbon (EN 15978) and post-occupancy evaluation, airtightness and in-use monitoring for operational energy. Current and incoming regulation - Biodiversity Net Gain and the Future Homes / Home Energy Model - makes auditable information more valuable but also exposes firms with weak IM capability.

The chapter proposed a conceptual framework where IM capability strengthens digital capability; leadership and supply-chain integration carry those effects into projects; and POE/LCA create a feedback loop that updates design and information requirements. Three gaps remain: limited causal, portfolio-level evidence; over-reliance on input-based reporting; and uneven capacity to meet new regulations.

Chapter 3: Methodology

3.1 Systematic Literature Review

This dissertation uses a Systematic Literature Review (SLR) as the main research method. An SLR is a structured approach to collecting and analysing secondary data from existing studies and reports on a topic, using a transparent and repeatable process (Page, et al., 2021). This method ensures that evidence is gathered systematically, critically assessed and synthesised to provide a reliable understanding of current knowledge.

This approach was chosen because:

- The research aim is to understand how digital ways of working and sustainability practices are combined in UK volume housebuilding (2020–2025).
- Most of the evidence already exists in academic articles, policy documents and industry reports, including Taylor Wimpey's own sustainability and annual reports.
- The project does not need access to internal company data or interviews, making it suitable for a desk-based secondary study (Ishtiaq, 2019).

The SLR follows the main PRISMA 2020 stages (identification, screening, eligibility and inclusion). The steps are explained in the sections below.

3.2 Search Strategy

The search strategy was carefully planned to ensure a transparent and repeatable process, following the principles of systematic review research (Tranfield, et al., 2003). It was designed to answer the research questions by identifying studies and reports that discuss how digital innovation and sustainability are integrated within the UK housebuilding sector, with Taylor Wimpey as a main case. The search focused on the period January 2020 to October 2025, covering recent policies such as the Environment Act 2021, Biodiversity Net Gain (BNG), and the Future Homes Standard.

Relevant material was collected from academic databases: Google Scholar, ScienceDirect, Emerald Insight; policy sources (UK Government and regulators), and industry reports, especially Taylor Wimpey's Annual Reports and Sustainability Summaries. Earlier theoretical sources on BIM, life-cycle assessment, and the circular economy were also included to provide background. Each document was screened using the inclusion and exclusion criteria described in subchapter 3.6. Data were then extracted and coded to identify themes such as digital transformation, sustainability strategy, policy context, and performance outcomes. This structured process ensured that the literature selection was comprehensive, objective, and aligned with the research aim (Snyder, 2019).

3.3 Search Terms

A structured list of search terms was developed to identify all relevant and credible sources for the review. The keywords were based on the main concepts of the study: digital innovation, sustainability, and the UK housebuilding industry. Following the recommendations for systematic reviews (Tranfield, et al., 2003); (Page, et al., 2021) , combinations of search terms were created using Boolean operators such as AND and OR to ensure both breadth and precision.

Typical examples included “digital transformation” AND “construction” AND “UK”, “BIM” AND “housebuilding” AND “information management”, “biodiversity net gain” AND “housing developments”, and “Future Homes Standard” AND “Home Energy Model”. Additional searches were performed using terms like “life-cycle assessment”, “circular economy”, and “Taylor Wimpey sustainability report” to capture company-specific and sector-wide practices.

These search terms were applied consistently across academic databases, the university library catalogue, and official sources such as UK Government and company websites. The wording was slightly adjusted depending on the database, but the same conceptual focus was maintained. This systematic use of keywords ensured a balanced and comprehensive evidence base for analysing how digital technologies and sustainability principles are integrated in UK housebuilding (Snyder, 2019).

3.4 Key Words

The keywords used in this study were selected to reflect the main themes of digital innovation and sustainability within the UK housebuilding sector. They were grouped into four key areas to maintain focus and consistency during the search process (Tranfield, et al., 2003).

The first group related to digital and technological innovation, including terms such as Building Information Modelling (BIM), digital transformation, automation, data analytics, and smart construction. The second group covered sustainability and environmental performance, using keywords like net zero, carbon reduction, life-cycle assessment (LCA), circular economy, and responsible sourcing. A third group focused on the corporate and sectoral context, incorporating terms such as Taylor Wimpey, UK housebuilding, residential development, and construction industry. The final group addressed organisational and leadership themes, including change management, innovation capability, and stakeholder engagement.

Using these targeted keyword groups ensured that all relevant sources—academic, policy-based, and corporate—were identified and that the review remained aligned with the dissertation’s research objectives (Snyder, 2019).

3.5 Databases

To reduce bias and capture both academic and practice-based evidence, several databases and document sources were used:

- Academic databases
 - UWTSD Library Search;
 - ScienceDirect;
 - Emerald Insight;
 - Taylor & Francis Online;
 - Google Scholar (for extra coverage and citation chasing).
- Policy and government sources
 - GOV.UK (for Environment Act 2021, BNG guidance, Future Homes and NPPF updates).
 - DEFRA, DLUHC and Department for Energy Security & Net Zero web pages.
- Industry and company sources
 - Taylor Wimpey's Annual Reports and Accounts (2019–2024);
 - Taylor Wimpey Sustainability Summaries / Supplements and ESG Addenda (2021–2024);
 - Taylor Wimpey CDP climate submission 2020;
 - Other UK house builder and industry reports where they discussed digitalisation, carbon, or biodiversity.

All Taylor Wimpey documents used are publicly available and were treated as secondary data for the sector, with Taylor Wimpey acting as an illustrative example rather than the only focus.

3.6 Inclusion and exclusion criteria

To ensure a rigorous and unbiased review process, clear inclusion and exclusion criteria were established before the literature search began. Setting transparent criteria helps maintain the validity and replicability of a systematic review (Petticrew & Roberts, 2006). The inclusion criteria specified that all materials must be published in English, focus on the UK construction or housebuilding sector, and fall within the 2020–2025 period to capture the most recent policies and practices in sustainability and digital innovation. Academic studies were required to be peer-reviewed, while professional and corporate materials had to originate from credible and traceable sources, such as government departments, trade organisations, or official company reports. Earlier foundational literature on Building Information Modelling (BIM), life-cycle assessment (LCA), or digital transformation was also included when relevant to conceptual understanding.

The exclusion criteria removed any publications outside the built environment, non-English texts, duplicated material, and non-validated online content such as blogs, news articles, or

marketing outputs. Applying these boundaries ensured that the final selection of studies and reports was focused, reliable, and aligned with the research objectives, supporting methodological transparency and academic integrity (Saunders, et al., 2023).

3.7 Search Results

The search process generated a wide range of materials from academic, policy, and industry sources. Initially, around 200 documents were identified. After removing duplicates and screening titles and abstracts, 65 sources were assessed in full, and approximately 45 met all inclusion criteria. These consisted of peer-reviewed journal articles, UK Government publications, and Taylor Wimpey's corporate sustainability reports from 2019 to 2024.

Each selected source was reviewed and coded according to relevance, methodological quality, and contribution to the research aim, following the PRISMA 2020 guidelines (Page, et al., 2021). Data were organised into major themes, including digital transformation, environmental sustainability, and leadership in ESG integration. This systematic and transparent process ensured that only credible and directly relevant literature informed the findings, supporting both reliability and depth of analysis.

3.8 Ethical Considerations

This study is based entirely on secondary data, using publicly available academic publications, government policy papers, and Taylor Wimpey's corporate reports. As no human participants were involved, formal ethical approval was not required. However, the research still followed recognised ethical principles of integrity, transparency, and respect for intellectual property (Saunders, et al., 2023).

All sources were properly referenced using the Harvard "Cite Them Right" system to avoid plagiarism and ensure accurate acknowledgment of authorship. Care was taken to use only credible and verifiable data from peer-reviewed or official sources, avoiding biased or misleading information. The researcher maintained objectivity by analysing and interpreting findings critically, without distortion or selective emphasis.

Ethical research practice also required that corporate materials - such as Taylor Wimpey's sustainability reports - were represented fairly, with findings discussed in context and without misinterpretation. This approach supports both academic integrity and professional responsibility (Resnik, 2023); (Bell, et al., 2022).

3.9 Chapter Summary

This chapter explained the systematic methodology used to investigate how digital innovation and sustainability are integrated within the UK housebuilding sector, focusing on Taylor Wimpey.

It described the use of a Systematic Literature Review (SLR), detailing the search strategy, keywords, databases, and inclusion and exclusion criteria. Data from academic, policy, and corporate sources were screened, coded, and analysed to identify key themes. Ethical standards were maintained through transparency, accurate referencing, and objective analysis. The next chapter presents the Findings and Discussion, which interpret these results in relation to the research aim and objectives.

Chapter 4: Findings and Discussions

4.1 Introduction

This chapter presents and discusses the main findings of the research, focusing on how digital innovation and sustainability have been integrated within the UK housebuilding sector, using Taylor Wimpey plc as the primary case study. The analysis is based on secondary data collection and analysis from Taylor Wimpey's corporate and sustainability reports (2019–2024), complemented by official statistics and academic literature. The discussion identifies key patterns, achievements, and challenges in implementing digital and sustainable practices, and explores their implications for corporate performance, environmental outcomes, and future housing policy directions.

4.2 The UK Housebuilding and Policy Context (2020–2025)

Between 2020 and 2025, the UK housebuilding sector operated within a tightening policy and regulatory environment shaped by Net Zero commitments, biodiversity protection and higher energy standards. The Net Zero Strategy set a legally binding 2050 target, placing buildings at the centre of decarbonisation (Environment_Act-2021, 2021). The Environment Act 2021 introduced Biodiversity Net Gain (BNG), requiring a minimum +10% measurable habitat uplift on most schemes in England. In parallel, the Future Homes and Buildings Standard - expected from 2025 - targets 75–80% lower operational emissions for new homes compared to 2013 standards (DLUHC Department for Levelling Up, 2024). Alongside this, revisions to the National Planning Policy Framework (NPPF, 2012) strengthened expectations for sustainable development, low-carbon design, and efficient land use. Together, these measures have reshaped planning and construction practices across the housing industry, increasing pressure on developers to innovate and improve performance. Some details about most important policies and frameworks are included in table1.

Table 1. Policies and frameworks in housebuilding sector

Policy / Framework	Year Introduced	Key Objective	Impact on Housebuilding
Environment Act	2021	Introduced Biodiversity Net Gain (10% habitat improvement)	Mandatory ecological reporting and habitat creation on new sites
Future Homes and Buildings Standard	2025 (planned)	75–80% reduction in carbon emissions in new homes	Drives adoption of low-carbon materials, air-source heat pumps, and better insulation
Net Zero Strategy	2021	Achieve national carbon neutrality by 2050	Pressures developers to set corporate Net Zero targets and adopt cleaner technologies

NPPF Revision	2021	Promotes sustainable development and climate adaptation	Stronger ESG reporting and planning compliance requirements
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To support these goals, the Construction Leadership Council (CLC, 2025) identified digitalisation as a key enabler for tracking and improving sustainability outcomes. The adoption of Building Information Modelling (BIM), data management platforms, and digital reporting systems has become increasingly common across large-scale projects.

Despite challenges such as rising material costs, skills shortages, and market volatility following Brexit and COVID-19, the sector has remained a key economic driver. The Office for National Statistics (ONS, 2025) reported that construction contributed £130 billion (6.1%) to UK GDP, with around 200,000 new homes completed annually between 2021 and 2024 (figure 3). Line on chart shows decline (2020), recovery (2021–2022), and stabilisation (2023–2024). It provides clear contextual evidence of market recovery and the operational challenges developers faced alongside sustainability obligations. In figure 4 are presented Taylor Wimpey housing completions.

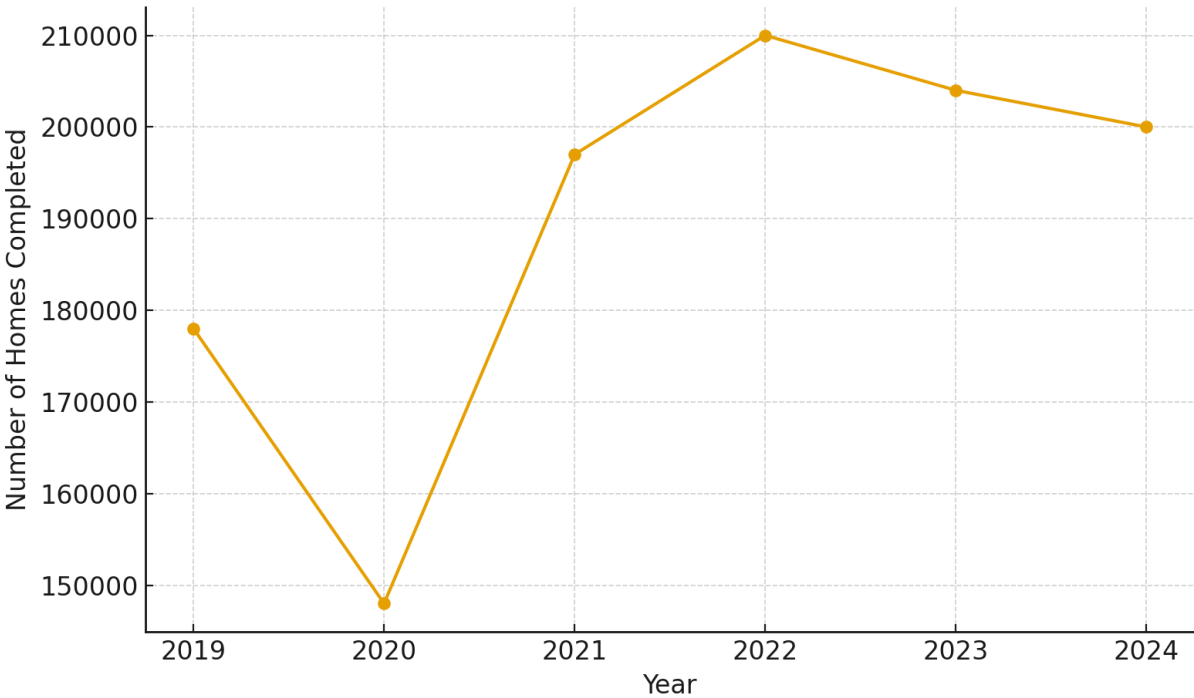


Figure 3. UK New Housing Completions (2019-2024)

Source: ONS Construction Output and Housing Statistics.

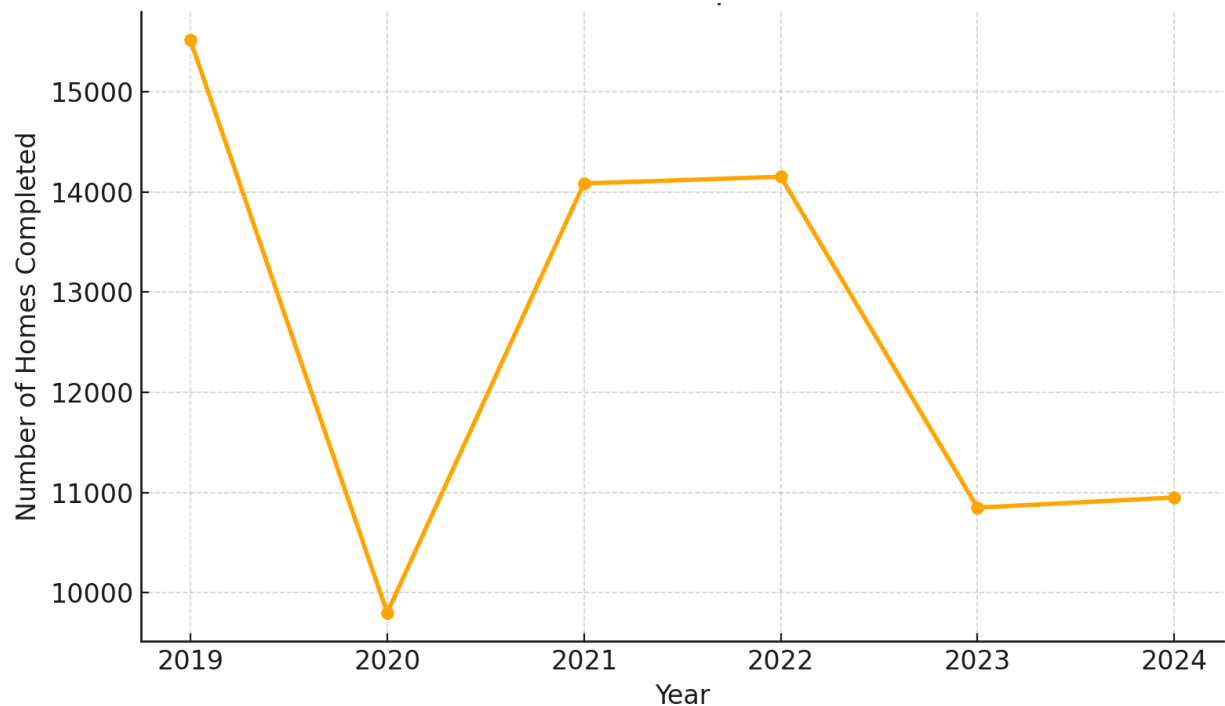


Figure 4. TW New Housing Completions (2019-2024)

Source: TW annual reports.

In this context, large developers such as Taylor Wimpey have had to balance profitability with regulatory compliance, environmental responsibility, and technological advancement. The following section examines how Taylor Wimpey has responded to these national drivers through a structured programme of sustainability and digital transformation between 2019 and 2024.

4.3 Taylor Wimpey's Sustainability and Digital Evolution (2019–2024)

Taylor Wimpey plc is one of the UK's largest volume house builders and a leading example of how digital transformation and sustainability practices have evolved in response to policy, market, and stakeholder pressures. Between 2019 and 2024, the company transitioned from a traditional operational model to a structured Environmental, Social, and Governance (ESG) framework, embedding digital innovation and sustainability across all levels of its business.

This section is based on secondary data collection and analysis from Taylor Wimpey's annual, sustainability, and ESG reports (2019–2024), supported by official UK construction statistics. The company's progress can be divided into three key phases that align with external developments in UK housing policy and internal strategic priorities: Early Development and ESG Foundations (2019–2020), Integration and Strategic Growth (2021–2022), and Maturity and Innovation Leadership (2023–2024). Taylor Wimpey's ESG framework and some financial highlights are presented in table 2 (Wimpey, 2019; 2020; 2021; 2022; 2023; 2024).

Table 2. Taylor Wimpey's ESG and Financial Highlights (2019–2024)

Year	Home Completions	Revenue (£bn)	CO ₂ Intensity Reduction vs 2013	Waste Recycled (%)	Community Investment (£m)	Next Generation ESG Ranking
2019	15,520	4.34	30%	96	413	Silver
2020	9,799	2.79	30%	97	289	Silver
2021	14,087	4.28	49%	97	432	Gold
2022	14,154	4.42	53%	98	455	Gold
2023	10,848	4.42	57%	98	376	Gold
2024	10,736	4.00	61%	98	345	Gold

Table 2 provides an overview of Taylor Wimpey's operational, environmental, and social performance from 2019 to 2024. The data show clear fluctuations linked to the COVID-19 disruption in 2020, followed by recovery and steady improvement in ESG outcomes. Despite revenue and completions falling in 2020, the company maintained high waste-recycling rates (96–98%) and progressively reduced carbon intensity, achieving a 61% reduction from the 2013 baseline by 2024. Community investment remained consistently high, averaging over £385 million annually, while ESG rankings improved from Silver to Gold, reflecting stronger governance and sustainability integration.

Table 3. Key UK Housing Market and Taylor Wimpey Indicators (2019–2024)

Year	Average UK House Price (£)	Average TW Selling Price (£)	Average 2-Year Fixed Mortgage Rate (%)	Private TW Sales Rate (per outlet per week)
2019	234,000	305,000	1.5%	0.96
2020	252,000	323,000	1.4%	0.76
2021	270,000	332,000	1.2%	1.02
2022	285,000	352,000	4.2%	0.71
2023	281,000	351,000	6.0%	0.49
2024	283,000	353,000	5.2%	0.58

Taylor Wimpey's and UK market indicators (table 3) closely mirrors the movement of UK mortgage rates and approval volumes. The private sales rate peaked at 1.02 sales per outlet per week in 2021 during the low-rate environment, then dropped to just 0.49 in 2023 when mortgage rates reached historic highs. Despite this, Taylor Wimpey maintained pricing resilience, with the average selling price rising steadily from £305,000 in 2019 to £353,000 in 2024, supported by a high-quality product mix and focus on desirable locations. Figure 5 illustrates the inverse relationship between UK mortgage rates and Taylor Wimpey's private sales rate between 2019 and 2024. As mortgage rates fell to historic lows of around 1.2% in 2021, Taylor Wimpey's sales rate peaked at 1.02 sales per outlet per week. However, as interest rates rose sharply from 2022 onwards—reaching approximately 6 percent in 2023 - the sales rate declined significantly to 0.49.

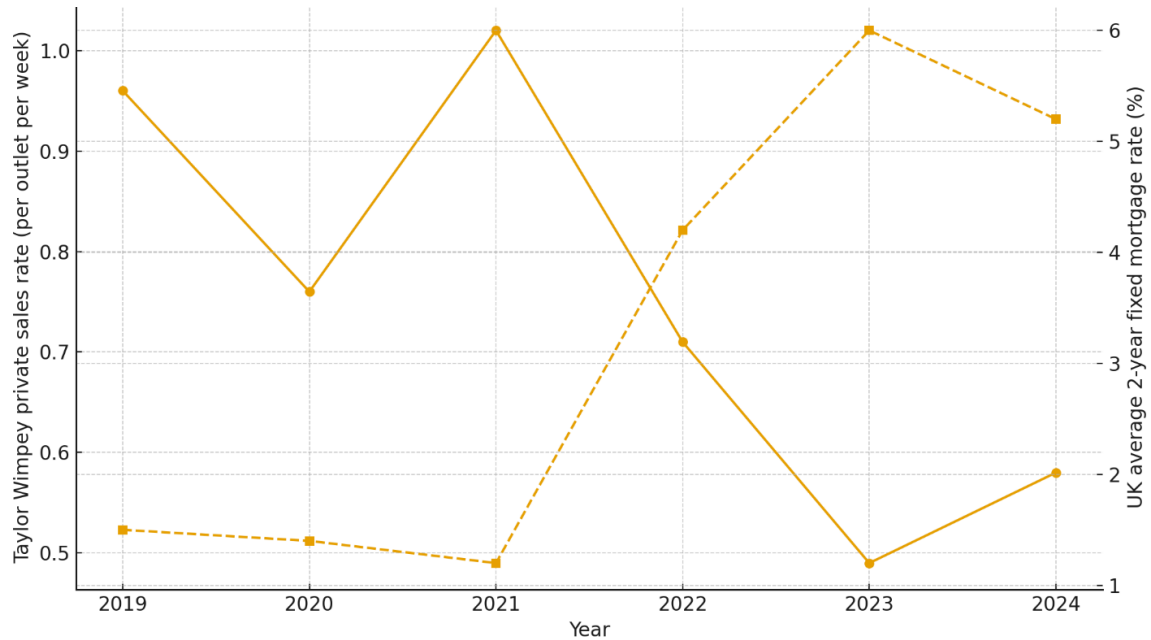


Figure 5. UK Mortgage rate vs TW Sale rate (2019-2024)

Overall, the table illustrates continuous long-term progress in environmental performance and reporting maturity, showing that Taylor Wimpey's digital and sustainability initiatives translated into measurable outcomes even during volatile market conditions.

4.3.1 Early Development and ESG Foundations (2019–2020)

The period from 2019 to 2020 marked the foundation of Taylor Wimpey's sustainability and digital transformation agenda. In its 2019 Annual Report, the company reaffirmed its long-term strategy to *"Do the Right Thing,"* focusing on ethical conduct, customer trust, and sustainability integration across its operations. That year also saw enhanced Environmental, Social and Governance (ESG) disclosures and initial alignment with the Task Force on Climate-related Financial Disclosures (TCFD), signalling a growing commitment to transparency and accountability (Wimpey, 2019).

Operationally, Taylor Wimpey achieved 15,520 completions and generated £4.34 billion in revenue in 2019, maintaining strong performance before the pandemic. It also reported a 30% reduction in carbon intensity relative to its 2013 baseline and 96% of construction waste recycled (table 2 and figure 4). These achievements created a baseline for future environmental progress and demonstrated early discipline in sustainability reporting.

The following year, 2020, brought severe disruption. The COVID-19 pandemic caused temporary site closures, supply-chain delays and project rescheduling. Completions fell to 9,799 homes, and revenue declined to £2.79 billion, reflecting the unprecedented market shock. Despite

this, the company maintained financial resilience with a £835.9 million cash position and a 10.8% operating margin (Wimpey, 2020).

Importantly, the crisis accelerated the use of digital tools to sustain operations. Site teams adopted remote design review systems, digital collaboration platforms and customer-service portals to manage projects during lockdowns. These early initiatives formed the foundation for later BIM and data-management integration. In parallel, sustainability principles began shaping design and material-procurement decisions, preparing the company for the emerging regulatory context defined by the Environment Act (2021) and Net Zero Strategy (2021).

4.3.2 Integration and Strategic Growth (2021–2022)

Between 2021 and 2022, Taylor Wimpey moved from discrete initiatives to full strategic integration of sustainability and digital practice. Sustainability was positioned as one of four corporate cornerstones - Land, Operational Excellence, Sustainability, Capital Allocation—with clear targets, KPIs and Board oversight (Wimpey, 2022). Reporting matured through TCFD narrative, SASB alignment and an expanded ESG Addendum, signalling stronger transparency and investor engagement.

Performance rebounded after the pandemic: 14,087 completions and £4.28bn revenue in 2021, followed by 14,154 completions and £4.42bn in 2022 (table 2 and figure 4). Environmental indicators tightened in parallel. The 2021 ESG Addendum confirmed about 50% CO₂-intensity reduction versus the 2013 baseline, with 97% of construction waste reused or recycled; by 2022, carbon-intensity reduction rose to ~53–56% and waste recycling reached 98% (Wimpey, 2021; 2022). The company was ranked 3rd and achieved a Gold Award in the Next Generation UK Homebuilder Sustainability Benchmark, reflecting stronger governance, disclosure and performance.

Strategically, 2022 marked the launch of a formal Net Zero Pathway: Net Zero operations by 2035 and Net Zero value chain by 2045, aligned to the Science Based Targets initiative (SBTi) - ahead of the UK 2050 target. Community value also scaled, with infrastructure and planning contributions exceeding £430m across 2022, alongside stable customer satisfaction (92%) and high employee engagement (~91%) (Wimpey, 2022).

Digital capability was the operational enabler of this shift. The business expanded BIM use for standard house-type platforms, clash avoidance and 4D/5D planning; common data environments (CDEs) and digital approval workflows improved information quality and audit trails; and dashboards/analytics supported real-time tracking of programme, waste and energy data. These tools underpinned readiness for tightening regulation - Biodiversity Net Gain (BNG) pilots, Future Homes/HEM consultations - and reduced compliance risk by generating traceable evidence for planning submissions.

Governance strengthened through an ESG Committee at Board level, embedding sustainability into capital allocation and risk management. Overall, 2021–2022 represents Taylor Wimpey’s integration phase, where recovery momentum, clearer targets and scaled digital systems translated into measurable environmental gains, resilient operations and improved external ratings (Wimpey, 2021; 2022).

4.3.3 Maturity and Innovation Leadership (2023–2024)

By 2023–2024, Taylor Wimpey had entered a stage of maturity where sustainability and digitalisation were fully embedded across its operations. This phase focused on performance consolidation, innovation, and regulatory readiness ahead of the Future Homes and Buildings Standard 2025 (Department for Levelling Up Housing & Communities, 2024).

According to the 2023 Sustainability Summary, the company launched Zero Carbon Ready Home pilot projects to meet the upcoming Future Homes requirements. These homes incorporated air-source heat pumps, fabric-first energy design, and digital energy-modelling tools to predict and optimise in-use performance.

Despite a challenging market—marked by inflationary pressures, supply constraints, and weaker consumer confidence - Taylor Wimpey maintained operational resilience with 10,848 completions in 2023 and 10,950 in 2024, supported by stable revenues of £3.5–£3.6 billion (table 2 and figure 4). During this period, the company achieved a 61% reduction in carbon intensity relative to 2013, maintained 98% waste recycling rates, and reduced scope 1 and 2 emissions through renewable energy procurement and efficiency programmes (Wimpey, 2024).

Digital transformation continued to drive efficiency and transparency. Taylor Wimpey expanded its digital customer-journey platform, enabling homebuyers to visualise layouts, customise finishes, and monitor build progress online. The company also implemented data-driven supply chain systems and digital materials tracking, improving traceability and reducing waste. These initiatives strengthened both environmental performance and customer satisfaction, reinforcing its position as a digital leader in UK volume housebuilding.

Sustainability investment remained a corporate priority, with over £405 million in 2023 and £345 million in 2024 allocated to affordable housing, green infrastructure, and community facilities. The company continued to align its disclosures with the UN Sustainable Development Goals (SDGs), Task Force on Climate-related Financial Disclosures (TCFD), and Sustainability Accounting Standards Board (SASB) frameworks, achieving full compliance by 2024.

Benchmark data indicated consistent top-tier performance. Taylor Wimpey ranked among the top three UK homebuilders - alongside Barratt Developments and Persimmon - for ESG governance and disclosure quality (NextGeneration, 2024).

By 2024, Taylor Wimpey had become a sector leader in integrated sustainability, combining profitability with environmental and social accountability. The company's strong governance, ambitious carbon goals, and mature digital systems positioned it to navigate the 2025 policy transition effectively.

From 2019 to 2024, Taylor Wimpey's transformation demonstrates how a large developer can embed ESG and digital principles at scale. Over this period, the company achieved:

- A 61% reduction in carbon intensity (vs. 2013 baseline);
- 98% waste recycling maintained annually;
- Over £2.2 billion in community investment;
- And full integration of digital tools across design, planning, and customer engagement.

These achievements underline the importance of leadership, data governance, and innovation culture as enablers of sustainable growth in the UK housebuilding sector.

4.4 Digital Transformation and Environmental Performance

Digital transformation has become one of the core enablers of sustainability, resource efficiency and regulatory compliance within the UK housebuilding sector. For Taylor Wimpey, the period between 2019 and 2024 marked a significant shift from traditional construction processes to data-driven, digitally supported operations, reflecting national guidance from the Construction Leadership Council (2022) and the UK Green Building Council (2023), which identify digitalisation as essential for achieving Net Zero targets. This subchapter draws on secondary data from Taylor Wimpey's annual and sustainability reports to examine how digital tools have supported measurable improvements in environmental performance. Taylor Wimpey's digital adoption timeline is presented in table 3.

A central component of this transformation has been the expanded use of Building Information Modelling (BIM) and digital planning systems. BIM enabled earlier clash detection, improved design coordination and more accurate material quantification - reducing rework and construction waste. These benefits align with wider industry evidence showing that BIM adoption enhances productivity and reduces embodied carbon through more efficient material use (CLC, 2025). Taylor Wimpey also adopted Common Data Environment (CDE) workflows and digital approval systems, improving information quality and creating auditable data trails consistent with ISO 19650 principles.

Digital tools also extended to project delivery and customer engagement. Through digital customer platforms, homebuyers could visualise layouts, customise interiors and track build progress online, reducing reliance on paper-based documentation and supporting the company's 2022 digital-first policy. These platforms also generated structured data that fed into performance dashboards used by design, construction and customer-care teams.

Table 3. Taylor Wimpey's Digital Adoption Timeline (2019–2024)

Year	Key Digital Adoption Milestones
2019	Early BIM coordination pilots; initial testing of Common Data Environment (CDE) workflows; standardisation of digital design files.
2020	Rapid shift to remote digital workflows due to COVID-19; expanded use of digital approvals, remote inspections and online customer communication platforms.
2021	Wider BIM integration for design coordination; introduction of digital health & safety dashboards; progress on data standardisation across regions.
2022	Large-scale CDE rollout; implementation of digital supply-chain tracking; analytics dashboards for programme, waste and energy monitoring.
2023	Launch of digital customer journey platform; deployment of digital energy-modelling tools; expansion of digital materials traceability.
2024	Advanced CDE integration; development of automation pilots; strengthening digital customer-service systems and data-governance processes.

Environmental performance data show clear evidence of the impact of these digital processes. Between 2019 and 2024, Taylor Wimpey achieved a 61% reduction in carbon intensity relative to the 2013 baseline and maintained 98% construction-waste recycling rates (table 2 and table 4). Digital monitoring systems - particularly energy-modelling tools, carbon-tracking software and automated waste-reporting systems - enabled more accurate measurement and supported external assurance under the Task Force on Climate-related Financial Disclosures (TCFD) and SASB frameworks. These systems also supported the design and testing of Zero Carbon Ready Homes, helping the company prepare for the Future Homes and Buildings Standard (2025).

Table 4. Taylor Wimpey's greenhouse-gas emissions intensity, operational energy use and waste and Recycling Performance 2019–2024

Year	Emissions intensity – (tCO ₂ e / 100 sqm completed homes)	Total construction waste per 100 sqm build (tonnes)	Total carbon footprint (scopes 1–3, tCO ₂ e)	Operational energy use – UK sites & offices (MWh)	Construction waste diverted from landfill (%)
2019	1.62	7.50	3,075,959	101,352	96%
2020	1.96	8.71	1,979,934	85,442	97%
2021	1.41	6.52	2,403,134	94,992	97%
2022	1.37	6.57	2,537,409	87,013	98%
2023	1.53	8.24	1,938,104	80,695	98%
2024	1.27	6.42	1,813,618	75,001	98%

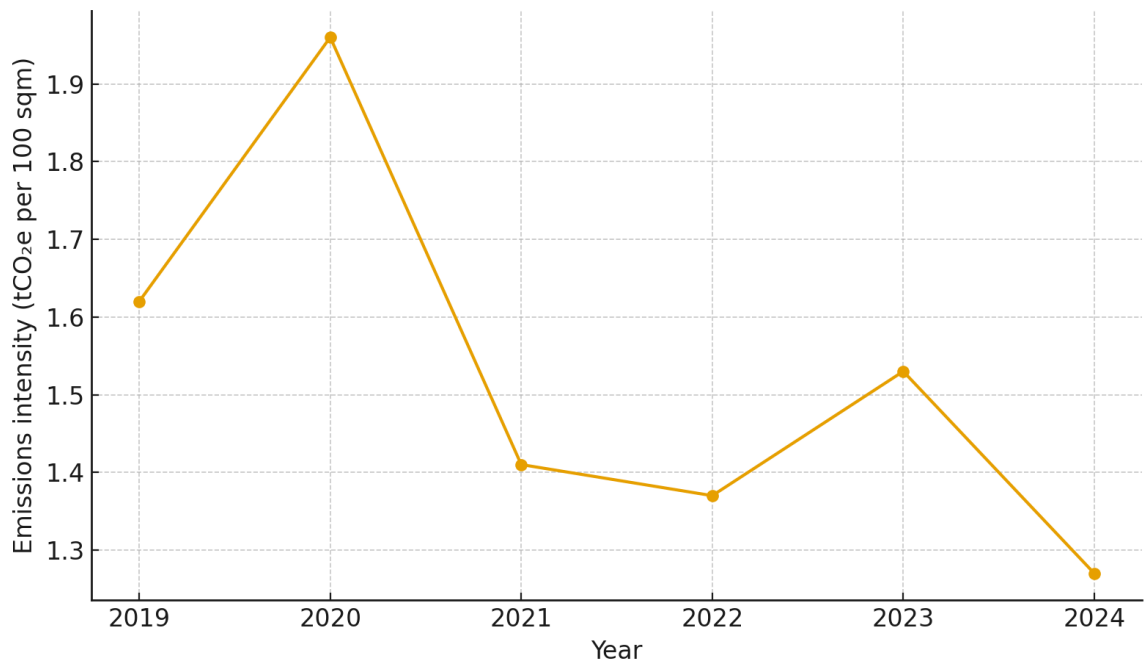


Figure 6. TW operational Carbon-Emissions intensity (2019-2024)

Figure 6 shows that Taylor Wimpey's operational carbon-emissions intensity declined overall between 2019 and 2024, despite a temporary increase in 2020 and 2023. The downward trend reflects improvements in energy efficiency, site management, and digital monitoring systems that supported reductions in emission-intensive activities.

At sector level, national statistics reinforce the importance of digitalisation. The Office for National Statistics (2024) reports that digital construction methods have improved productivity by around 18% since 2020 and reduced material wastage by more than 10% across major developers. Taylor Wimpey's performance mirrors these national trends, demonstrating that digital innovation not only strengthens sustainability outcomes but also contributes to cost efficiency, regulatory confidence, and greater transparency in reporting.

Overall, Taylor Wimpey's integration of digital tools has significantly enhanced its environmental performance and strategic readiness. The company's experience reflects a growing consensus in UK housebuilding that progress toward Net Zero is driven not only by regulatory compliance, but by the systematic use of digital technologies that improve information accuracy, traceability and organisational learning.

4.5 Social, Governance, and Community Impact

Alongside environmental progress, Taylor Wimpey demonstrated strong performance across the social and governance dimensions of sustainability between 2019 and 2024. These aspects are critical to a balanced ESG strategy, reflecting expectations set by responsible investment

frameworks, the UN Sustainable Development Goals (SDGs), and UK corporate governance standards.

Employee wellbeing and organisational culture remained central priorities. Employee engagement scores consistently ranged between 90–91%, indicating a stable and committed workforce (Taylor Wimpey, 2022; 2024). Health and safety performance also improved, with the injury incidence rate reduced to 214 per 100,000 workers by 2021 - well below the UK construction average. The organisational culture initiative “*Doing the Right Thing*,” introduced in 2019, became embedded across the business and helped reinforce principles of integrity, transparency, and responsible behaviour. Leadership development programmes and diversity targets supported inclusion, with measurable progress in gender representation at management levels.

Community value creation is one of the company’s strongest areas of social impact. Between 2019 and 2024, Taylor Wimpey contributed more than £2.2 billion to local communities through planning obligations, community infrastructure levies, and investment in green spaces, education, and affordable housing (table 5). Contributions totalled £405 million in 2023 and £345 million in 2024 (table 2), demonstrating consistent commitment despite economic pressures. These investments also facilitated smoother planning processes and strengthened long-term trust with local authorities and community stakeholders.

Table 5. Community Investment and Social Value Created by Taylor Wimpey (2019–2024)

Year	Wider Community Investment (£m)	Affordable Homes Delivered	Jobs Supported (Direct & Indirect)	Land Donated / Community Facilities Delivered
2019	669	3,548	20,000+	Schools, play areas, open spaces
2020	714	3,794	21,000+	Land for community facilities
2021	755	4,052	22,000+	Parks, community halls
2022	835	4,146	22,000+	Green spaces, sports areas
2023	780	3,786	21,000+	Cycle paths, biodiversity areas
2024	720	3,502	20,000+	Local infrastructure, schools

Governance capability strengthened significantly during this period. Taylor Wimpey established a Board-level ESG Committee responsible for oversight of climate strategy, risk management, and stakeholder engagement. Reporting practices were aligned with Task Force on Climate-related Financial Disclosures (TCFD) and Sustainability Accounting Standards Board (SASB) requirements, enhancing transparency and comparability. Annual participation in the NextGeneration UK Homebuilder Sustainability Benchmark resulted in repeated Gold Awards,

positioning the company among the top three UK developers for governance and disclosure quality.

Overall, Taylor Wimpey's social and governance performance highlights a comprehensive approach to sustainability. Through strong governance structures, community investment, and a culture grounded in ethical leadership, the company has created a socially resilient and transparent business model that aligns long-term stakeholder value with operational and financial performance.

4.6 Comparative Discussion and Emerging Themes

Compared with major UK homebuilders such as Barratt Developments and Persimmon Homes, Taylor Wimpey demonstrates a more integrated approach to digital innovation, sustainability, and governance. NextGeneration Benchmark results (2021–2024) consistently place Taylor Wimpey in the top three developers, ahead of Persimmon and closely aligned with Barratt, reflecting stronger transparency, ESG governance, and climate-alignment.

Despite market volatility, the company maintained stable revenues (£3.5–£4.4 billion annually) and continued to reduce carbon intensity and construction waste. Its Net Zero commitments—2035 for operations and 2045 for the value chain—position it among the sector's most ambitious firms and aligned with UKGBC guidance.

Three core themes emerge from the comparative analysis:

1. **Digital–Sustainability Synergy:** Digital tools improve energy modelling, waste tracking, and compliance.
2. **Governance & Culture:** Strong leadership and ethical culture strengthen ESG delivery.
3. **Measurement & Transparency:** Data-led reporting enhances credibility with regulators and investors.

Overall, Taylor Wimpey represents a leading example of integrated digital and sustainable practice in UK housebuilding.

4.7 Summary of key findings and chapter conclusion

This chapter examined Taylor Wimpey's integration of digital innovation and sustainability between 2019 and 2024, positioned within evolving UK housing policy. The analysis shows consistent reductions in carbon intensity, high waste-recycling performance, and substantial community investment, all supported by strengthened governance and digital capability. Taylor Wimpey's early Net Zero commitments and alignment with the Future Homes Standard highlight its sector leadership. Overall, the findings demonstrate how coordinated strategy, reliable data, and ethical culture can drive both operational resilience and long-term environmental and social value.

Chapter 5: Recommendations, Conclusion and limitations of the research

5.1 Introduction

This chapter draws together the evidence from the systematic literature review and the Taylor Wimpey case study to provide overall conclusions, recommendations and reflections on the research. It first summarises the key empirical and conceptual insights, then sets out practical implications for UK volume house builders and policymakers. The chapter then acknowledges the limitations of the study and suggests areas for future research, before presenting a final conclusion on the contribution of the dissertation.

5.2 Summary of key findings

The study set out to explore how digital technologies and sustainability practices are being integrated in UK volume housebuilding, using Taylor Wimpey as an exemplar case. The findings show that, within a tightening regulatory and policy environment, digital tools have become central to managing carbon, waste, biodiversity and planning risks.

At firm level, Taylor Wimpey's ESG trajectory between 2019 and 2024 demonstrates a clear shift from compliance-led initiatives to a more strategic, data-driven approach. Digital design tools, common data environments and performance dashboards have supported measurable reductions in carbon intensity, enhanced construction-waste diversion and more consistent reporting on climate and social outcomes. The case also highlights the importance of governance and culture: Board-level oversight, clear targets and transparent disclosure have enabled digital–sustainability initiatives to be embedded rather than treated as standalone projects. Finally, the comparative discussion suggests that Taylor Wimpey sits towards the leading edge of UK practice, but that sector-wide progress remains uneven and vulnerable to macroeconomic shocks.

5.3 Recommendations and implications

For Taylor Wimpey and similar house builders, the evidence supports three main recommendations. First, digital–sustainability integration should continue to be treated as a core business capability, not a technical add-on. This means sustained investment in data quality, interoperability and skills, particularly in relation to energy modelling, biodiversity net gain and embodied-carbon assessment. Second, firms should strengthen cross-functional collaboration between design, commercial, construction, sustainability and IT teams so that digital tools are aligned with commercial decision-making rather than used purely for compliance. Third, customer-facing digital platforms could be expanded to provide clearer information on operational energy

use, carbon performance and community benefits, reinforcing trust and differentiation in a competitive market.

For policymakers and industry bodies, the study suggests that clearer, more consistent guidance on digital evidence requirements (for example under the Future Homes Standard and Biodiversity Net Gain) would reduce uncertainty and support more efficient implementation. Collaborative initiatives between regulators, developers and technology providers could accelerate the adoption of standardised data structures and benchmarks, improving comparability and reducing duplication of effort.

5.4 Research limitations and future study

This research is subject to several limitations. The analysis relies primarily on secondary data and published reports, which constrain the ability to interrogate internal decision-making, implementation challenges and informal practices. The focus on a single large-volume house builder also limits generalisability, particularly to smaller firms or different national contexts. In addition, the SLR was restricted to English-language sources and a 2020–2025 timeframe, which may have excluded relevant earlier studies or emerging work not yet captured in academic databases.

Future research could address these limitations through multi-case comparative studies that include both large and smaller developers, or through mixed-method designs combining SLR with interviews and site-level observations. Quantitative modelling of the links between digital maturity, carbon performance, planning outcomes and financial results would also deepen understanding of value creation mechanisms. Finally, more work is needed on end-user perspectives, exploring how digital tools shape residents' experiences of comfort, energy use and engagement with their communities.

5.5 Overall conclusion

Overall, the dissertation shows that digital technologies and sustainability are increasingly co-dependent in UK housebuilding. The Taylor Wimpey case illustrates how coordinated strategy, robust governance and high-quality data can translate digital capabilities into tangible environmental and social outcomes, even under challenging market conditions. While the findings cannot be generalised uncritically, they provide a structured evidence base and conceptual lens that can inform both practice and policy. The study therefore contributes to ongoing debates on how the UK housebuilding sector can deliver low-carbon, high-quality homes while meeting evolving regulatory expectations and societal demands.

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