

Advisory Services and Digital Transformation in SMEs: A Framework for Evaluating Investment Readiness and Financial Returns

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Abstract

Small and medium-sized enterprises (SMEs) are under growing pressure to digitalise, yet many invest in technology without a clear view of whether they are ready to absorb it or how its returns will be measured. External advisory services, including accountants, management consultants, digital innovation hubs and public business-support programmes, are widely promoted as a remedy, but there is little guidance on how advisers should structure their contribution so that it improves the financial outcome of a digital investment. This paper addresses that gap by developing the **Digital Investment Readiness and Returns (DIRR) Framework**, a four-pillar model that connects (1) digital maturity, (2) investment appraisal, (3) implementation capacity and (4) benefits tracking, with advisory services acting as an enabling layer across all four. The paper specifies the constructs and indicators of each pillar, proposes a composite Investment Readiness Index (IRI) and links it to a readiness-adjusted net present value through a benefit realisation factor. A four-gate decision process translates the index into go, defer, stage or redesign decisions. An illustrative application to a hypothetical manufacturing SME shows how a project that appears highly attractive on a conventional appraisal (NPV of USD 98,531) becomes value-destroying once readiness is considered (NPV of USD -25,605), and how targeted advisory interventions restore a positive return (NPV of USD 8,709) even after advisory fees. Six research propositions are offered for empirical testing. The framework links readiness assessment directly to financial appraisal and gives

advisers, SME owners, lenders and policymakers a common, auditable language for digital investment decisions.

Keywords: *SMEs; digital transformation; advisory services; investment readiness; digital maturity; IT investment appraisal; benefits realisation; real options*

1. Introduction

Digital transformation has moved from a strategic aspiration of large corporations to an operational necessity for firms of every size. Cloud computing, software-as-a-service, e-commerce platforms, data analytics and increasingly accessible automation tools have lowered the entry cost of digital technologies, and the disruptions of 2020 and 2021 accelerated adoption among small businesses that had previously postponed it (OECD, 2021). In emerging economies, cloud migration and fintech-enabled digital lending have further widened SMEs' access to digital tools and to the finance needed to acquire them (Ladapo et al., 2022; Okafor et al., 2021). SMEs account for the large majority of firms and a substantial share of employment in almost every economy, so the success or failure of their digital investments has consequences that reach well beyond the individual enterprise.

Yet adoption is not the same as transformation, and spending is not the same as return. A recurring finding in the information systems literature is that the business value of information technology depends less on the technology itself than on complementary organisational resources such as skills, processes and management practices (Melville, Kraemer, & Gurbaxani, 2004; Brynjolfsson & Hitt, 2000). These complements take time and money to build, which is why the measured returns to digital investment often follow a "J-curve" in which productivity first dips before it rises (Brynjolfsson, Rock, & Syverson, 2021). Large firms can absorb this dip; SMEs, with thinner capital buffers and fewer specialist staff, often cannot (Love, Irani, Standing, Lin, & Burn, 2005). The broader productivity literature reached a similar conclusion after years of debate over the so-called productivity paradox: firm-level returns to computing are real but uneven, and depend on organisational practices that take time to build (Brynjolfsson, 1993; Brynjolfsson & Hitt, 2003; Hitt et al., 2002). SMEs matter disproportionately to this debate because they make up the bulk of firms and employment in both advanced and developing economies (Ayyagari et al., 2007), yet they face persistent finance constraints (Beck & Demirguc-Kunt, 2006; Berger & Udell, 1998).

SMEs also face a distinctive appraisal problem. Formal investment evaluation of IT projects is weak even in large organisations (Ballantine & Stray, 1998), and in SMEs it is frequently replaced by intuition, vendor claims or simple payback rules. Owner-managers are often unsure which benefits to expect, how to quantify intangible gains, and how to monitor whether forecast benefits actually materialise. The result is a pattern of under-investment in some firms and poorly targeted, under-realised investment in others.

External advice is a long-standing response to these knowledge gaps. Research on SME advice shows that accountants, consultants and public support agencies are among the most important sources of external knowledge for small firms, and that the use of advice is associated with growth (Bennett & Robson, 1999; Robson & Bennett, 2000). Innovation intermediaries can help firms articulate needs, source technology and manage change (Bessant & Rush, 1995; Howells, 2006). In the digital domain, governments and regional bodies have created digital innovation hubs, voucher schemes and diagnostic tools designed to channel this kind of support to SMEs (OECD, 2021). Evidence on these programmes suggests that deeper, more intensive support tends to produce larger effects than light-touch information services (Mole et al., 2011), and that the relationship of trust between an SME and its accountant strongly shapes whether advice is sought and acted upon (Blackburn et al., 2018).

However, two weaknesses limit the usefulness of current practice. First, digital maturity assessments, investment appraisal methods, change and implementation tools and benefits management techniques have developed as largely separate bodies of knowledge, each with its own vocabulary and instruments. An SME may receive a maturity score from one programme, a vendor business case from another source and no benefits follow-up at all. Second, the contribution of advisers is rarely specified in terms that link to financial outcomes. Advisory support is typically evaluated by participation counts or satisfaction surveys rather than by its effect on the expected and realised return of the investments it informs.

This paper responds by asking a design-oriented question: **How can advisory services evaluate and improve an SME's readiness for a digital investment in a way that is explicitly linked to the investment's expected and realised financial returns?** To answer it, the paper develops the Digital Investment Readiness and Returns (DIRR) Framework. The framework connects four pillars, namely digital maturity, investment appraisal, implementation capacity and benefits tracking, into a single decision logic, and positions

advisory services as an enabling layer that diagnoses, appraises, enables and verifies across the investment lifecycle.

The paper makes three contributions. Conceptually, it integrates research streams that have previously been treated separately and specifies how readiness should modify the financial appraisal of a digital project. Methodologically, it proposes a transparent Investment Readiness Index and a readiness-adjusted net present value that advisers can compute with information available in a typical SME engagement. Practically, it offers a stage-gate process and diagnostic instrument that advisers, owner-managers, lenders and programme designers can use to make and monitor decisions. The remainder of the paper is organised as follows. Section 2 describes the methodology. Section 3 synthesises the relevant literature and theory. Section 4 presents the conceptual model and illustrates its application. Section 5 discusses the results of the illustration, Section 6 sets out implications for theory and practice, Section 7 notes the limitations of the study, Section 8 outlines directions for future research, and Section 9 concludes.

2. Methodology

The paper follows a conceptual, design-oriented approach informed by design science research in information systems (Hevner, March, Park, & Ram, 2004; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). It also follows recognised approaches for conceptual articles that build a model by integrating theories from different domains (Jaakkola, 2020). Design science aims to create purposeful artefacts, such as models, methods and frameworks, that address an identified problem, and to evaluate them for utility. The procedure followed here has five steps:

- **Problem identification:** the disconnect between readiness assessment, appraisal and benefits tracking in SME digital investment decisions, established through the literature synthesis in Section 3.
- **Objectives definition:** the artefact should (a) be usable by advisers with information available in a typical SME engagement, (b) link readiness explicitly to financial returns, (c) support staged decision-making, and (d) generate learning across projects.
- **Design and development:** constructs and indicators were derived from the reviewed literature, guided by the maturity model design principles of Becker et al. (2009) and Mettler (2011), and integrated through the theoretical lenses in Section 3.8.

- **Demonstration:** the framework is applied to an illustrative, hypothetical SME case (Section 4.9) to show its mechanics and its effect on the investment decision.
- **Evaluation agenda:** testable propositions and an empirical validation programme are set out in Sections 4.8 and 8.

The literature synthesis drew on peer-reviewed journal articles, books and conference papers published up to 2023. Sources were identified through keyword searches combining terms for SMEs, digital transformation, advisory services, maturity models, IT investment appraisal, implementation and benefits realisation, supplemented by backward citation tracing from key studies and by a portfolio of applied studies on SME operations, finance, analytics and technology governance in emerging economies. The material was organised thematically around the four pillars of the proposed model, with theoretical lenses used to explain the relationships between them. The synthesis is integrative rather than exhaustive: its purpose is to ground the constructs and relationships of the model, not to map every study in each field.

The illustrative case is deliberately hypothetical. Its purpose is to demonstrate the internal logic and computational steps of the framework, not to provide empirical evidence of its effectiveness. All figures are constructed for illustration, and the calibration parameters used are explicitly labelled as assumptions to be estimated in future empirical work.

3. Literature Synthesis

3.1 Digital Transformation in SMEs

Digital transformation is commonly defined as a process in which digital technologies trigger significant changes to an organisation's value proposition, structures and processes (Vial, 2019). Verhoef et al. (2021) distinguish three phases: digitisation (converting analogue information into digital form), digitalisation (using digital technologies to improve existing processes) and digital transformation (changing the business model itself). For most SMEs the practical agenda sits in the first two phases, but the cumulative effect of many small projects can amount to transformation over time. Systematic reviews describe digital transformation as an organisational change process driven as much by strategy as by technology (Hanelt et al., 2021; Matt et al., 2015; Hess et al., 2016), in which digital technologies reshape both innovation and entrepreneurship (Yoo et al., 2010; Nambisan et al., 2017, 2019). Studies of manufacturing SMEs show that firms which prepare deliberately for digital business model change capture more value from it (Müller et al., 2018; Ghobakhloo & Iranmanesh, 2021), and

that dynamic capabilities underpin the creation of customer value through digitalisation (Matarazzo et al., 2021).

SME digitalisation differs from that of large firms in several respects. Resource constraints are tighter, decision-making is concentrated in the owner-manager, and technical expertise is often absent from the payroll (Eller, Alford, Kallmünzer, & Peters, 2020). Li, Su, Zhang and Mao (2018) show that SME entrepreneurs drive digital transformation through managerial cognition and the gradual building of capabilities, frequently relying on external platforms and partners. Systematic reviews identify finance, skills, leadership awareness and the absence of a coherent strategy as the most persistent barriers (Kraus, Jones, Kailer, Weinmann, Chaparro-Banegas, & Roig-Tierno, 2021). Early work on small business IS adoption reached similar conclusions, emphasising the role of the CEO's knowledge and attitudes together with organisational readiness and external pressure (Iacovou, Benbasat, & Dexter, 1995; Thong, 1999). Reviews of digital transformation in operations management identify automation, analytics and process redesign as the main channels through which value is created (Agboada et al., 2018), and sector evidence from manufacturing shows that operational gains depend on combining digital tools with analytics capability (Obukadata et al., 2021). In Sub-Saharan Africa, SME adoption of web-based payment portals has been shaped by trust, cost and infrastructure (Agyei et al., 2019), while cloud migration requires deliberate planning of workloads, security and skills (Ladapo et al., 2022). Related work shows that automation, data-driven analytics and customer-centric redesign can transform service operations (Nnabueze et al., 2023), that business analytics delivered through partnerships can widen digital inclusion (Rukh et al., 2023), and that digital supply chain transformation must embed IT risk and compliance controls from the outset (Mbonu et al., 2020). For very small firms, scaling depends on building operational infrastructure early rather than adding it after growth (Anyanwu, 2021).

3.2 Advisory Services and SMEs

Advisory services cover a wide spectrum, from routine compliance help to strategic consulting. Bennett and Robson (1999) found that external accountants and consultants are the most widely used private advisers among British SMEs, while public agencies play a complementary role. Robson and Bennett (2000) report a positive association between the use of external advice and employment growth, although causality is difficult to establish. Chrisman and McMullan (2004) show that outsider assistance acts as a knowledge resource that improves new venture survival, particularly when the assistance transfers tacit knowledge.

In technology adoption specifically, intermediaries perform functions such as articulating needs, scanning and selecting technologies, brokering relationships with suppliers, and supporting implementation and learning (Bessant & Rush, 1995; Howells, 2006). This literature suggests that the value of advice depends on what the adviser actually does, not simply on whether advice is received. It also highlights a recurring risk: advisers may focus on the front end of a project (diagnosis and selection) and disengage before benefits are realised. Advisers who already handle SME compliance obligations, such as tax and regulatory reporting, are well placed to embed digital tools in those workflows (Eyetssemitan et al., 2021). The IS literature provides more direct evidence on advisers in technology adoption. Small firms that lack internal expertise are more likely to implement information systems successfully when they engage capable external experts and when top management is actively involved (Thong et al., 1996), and the quality of consultants has been linked to computerisation success in small businesses (Soh et al., 1992). Gable (1996) shows that client success in consulting engagements is multidimensional, depending on the consultant's understanding of the client's problem as well as on the recommendations delivered. More broadly, the use of business advisers has been associated with SME performance, particularly where advice is tailored to the firm's stage of development (Berry et al., 2006). Advisory relationships in the SME finance space are also changing: fintech-driven treasury and cash management tools (Dada et al., 2021) and CFO-style strategic finance support (Isiekwu et al., 2021) are increasingly available to smaller firms, and banks have begun to offer non-financial advisory services as part of their partnership ecosystems (Agboada et al., 2020).

3.3 Digital Maturity Models

Maturity models describe an organisation's progress along a set of dimensions using ordered stages, typically from an initial to an optimised level (Becker, Knackstedt, & Pöppelbuß, 2009). Digital maturity models usually cover strategy, customer engagement, operations, technology, data, and people and culture. Westerman, Bonnet and McAfee (2014) argue that digital leaders combine strong "digital capability" with strong "leadership capability," and that firms excelling in only one dimension capture less value. Maturity models have also been built for narrower operational domains, such as standardising IT support across distributed offices (Anyanwu, 2019), showing how staged capability descriptions can guide improvement in resource-constrained settings. Mettler (2011) cautions that many maturity models are weakly grounded, poorly validated and better at description than at prescription. Design principles have since been proposed to make maturity models more useful, distinguishing descriptive, prescriptive

and comparative purposes (Pöppelbuß & Röglinger, 2011; de Bruin et al., 2005). In manufacturing, Industry 4.0 readiness and maturity models have proliferated (Schumacher et al., 2016), but a critical review finds that most are poorly suited to SMEs because they assume resources and capabilities that small firms do not possess (Mittal et al., 2018). For SMEs, a further limitation is that maturity scores are rarely connected to specific investment decisions: a firm may learn that it is at "level 2" without learning what that implies for the project it is considering.

3.4 Appraisal of Digital and IT Investments

IT investment appraisal has been studied for several decades. Renkema and Berghout (1997) classify ex-ante evaluation methods into financial, multi-criteria, ratio and portfolio approaches, noting that each captures only part of the value of an IT project. Ballantine and Stray (1998) found that organisations often use simple financial techniques such as payback and return on investment, apply them inconsistently and rarely revisit forecasts. Irani and Love (2002) argue that ex-ante evaluation must address intangible benefits, indirect costs and risks, which traditional discounted cash flow methods tend to ignore.

More recent work extends appraisal toward data-driven and analytics-based approaches. Studies propose decision models for capital allocation (Lawal & Oduleye, 2021a), align capital budgeting with project execution (Nwangwu et al., 2021), and use simulation and predictive models to quantify the financial impact of process optimisation and cost reduction in business transformation (Tonoyan et al., 2022a, 2022b). Measuring return on investment remains difficult wherever benefits are indirect or hard to attribute, as research on marketing ROI illustrates (Sanni et al., 2020). Data-driven executive decision systems and financial planning analytics that are aligned with strategy can make these appraisals more consistent (Lawal & Oduleye, 2019, 2021b), while predictive budgeting and demand forecasting models improve the revenue and cost projections on which they rest (Tonoyan et al., 2021a; Adesuyi et al., 2022). Financial analytics has also been linked directly to enterprise value creation and sustainable profitability (Lawal & Oduleye, 2018, 2023a; Medon & Oduleye, 2023), and behavioural factors are known to shape how managers interpret financial information (Lawal & Oduleye, 2023b). Evidence from adjacent fields reinforces the difficulty of valuing technology and intangible investments: studies of cybersecurity spending in healthcare (Ozowara et al., 2022) and of diversity and inclusion investments (Uchechi et al., 2022) both stress the need for explicit quantitative evaluation models.

Real options theory offers a partial remedy. Dixit and Pindyck (1994) show that when investments are irreversible and uncertain, the ability to wait, stage or abandon has economic value. Benaroch and Kauffman (1999) apply this reasoning to IT projects and demonstrate that a project with a negative static NPV can be worth undertaking if it is structured to preserve flexibility. For SMEs, staged pilots, modular cloud subscriptions and reversible contracts are practical embodiments of real options, yet they are seldom valued explicitly. IS researchers have shown how options analysis can be applied to software platform choices (Taudes et al., 2000) and how option value depends on the firm's ability to learn and absorb the technology (Fichman, 2004). The wider real options literature formalises the managerial flexibility to defer, stage, expand or abandon investments (Trigeorgis, 1996), and treats IT capability as a platform of digital options that enables future agility (Sambamurthy et al., 2003).

Most importantly for this paper, standard appraisal treats forecast benefits as given. The probability that an organisation can actually realise those benefits, which depends on its maturity and capacity, is either ignored or folded informally into a higher discount rate. This leaves no transparent link between organisational readiness and expected return. This gap persists despite long-standing calls to treat IS evaluation as a social and organisational process rather than a purely technical calculation (Farbey et al., 1992; Irani, 2002). Surveys of corporate practice show that even large firms rely heavily on NPV and IRR alongside simple payback (Graham & Harvey, 2001), while small businesses favour payback and owner judgement over discounted cash flow methods (Danielson & Scott, 2006). Research on IS business value similarly concludes that value depends on complementary investments and that measurement methods have not kept pace with how value is created (Kohli & Grover, 2008; Schryen, 2013).

3.5 Implementation Capacity

Implementation research shows that technology projects fail more often for organisational than for technical reasons. Dynamic capabilities, the ability to sense opportunities, seize them and reconfigure resources (Teece, 2007), are a precondition for converting digital investments into performance. Bharadwaj (2000) shows that IT capability, comprising infrastructure, human IT skills and IT-enabled intangibles, explains differences in firm performance. In SMEs, implementation capacity is shaped by leadership commitment, the availability of internal champions, project management discipline, access to finance for the full cost of the change, and the quality of vendor relationships (Thong, 1999; Eller et al., 2020). Studies of enterprise system implementation identify critical success factors such as top management support,

business process re-engineering, a balanced project team and effective communication (Nah et al., 2001), and show that the post-implementation "shakedown" phase determines whether expected benefits appear (Markus & Tanis, 2000). Research on SME enterprise system adoption confirms the importance of top management support, organisational readiness and external pressure (Ramdani et al., 2009). Organisational change scholarship adds that readiness for change is itself a collective state that leaders can build through clear messaging about discrepancy and efficacy (Armenakis et al., 1993; Weiner, 2009), and that transformations frequently fail when urgency, coalition building and short-term wins are neglected (Kotter, 1995). Zhu and Kraemer (2005) further demonstrate that the depth of post-adoption usage, not adoption alone, determines e-business value. Change management is a particular weakness in small business digital transformation: a systematic review by Eyetsemitan et al. (2023a) finds that lean, incremental change approaches suit SMEs better than large-scale programmes, and structured user acceptance testing reduces the risk of deploying systems that staff cannot or will not use (Eyetsemitan et al., 2023b). Workforce capacity, including the recruitment and integration of digitally skilled staff, is a further constraint in emerging-market enterprises (Akhigbe et al., 2020; Anyanwu, 2022). Talent development models for technology professionals in emerging markets (Wikiri, 2019) and capability-building approaches for distributed operations (Falemi et al., 2020) point to the same conclusion: skills must be developed deliberately alongside the technology. Project governance, including clear decision rights and risk controls, is equally important for delivery (Amayo et al., 2023).

3.6 Benefits Management and Tracking

The benefits management tradition argues that benefits do not appear automatically; they must be planned, assigned to owners and actively managed (Ward & Daniel, 2006). Peppard, Ward and Daniel (2007) propose principles such as identifying benefits explicitly, linking each benefit to the business and organisational changes required to deliver it, and assigning accountability. Tools such as the benefits dependency network make these links visible. Empirical studies show that formal benefits management remains uncommon even in large organisations (Ashurst et al., 2008) and that benefits are more likely to be realised when ownership, organisational change and post-implementation review are explicitly planned (Doherty et al., 2012). In SMEs specifically, IT evaluation and benefits management practices are often informal or absent (Love & Irani, 2004). IS success models offer a complementary view, tracing net benefits through system quality, information quality, service quality, use and user satisfaction (DeLone & McLean, 2003), while operations research on performance

measurement design stresses the need for balanced, well-specified indicators (Neely et al., 1995). Performance measurement research in SMEs shows that small firms often lack structured systems for monitoring outcomes and rely on a few financial indicators (Garengo, Biazzo, & Bititci, 2005). Balanced measurement approaches (Kaplan & Norton, 1996) can be adapted to SMEs, but only if kept simple. Data-driven performance indicators and business intelligence dashboards improve management visibility of outcomes (Sanni & Atima, 2021; Akin-Oluyomi & Akhigbe, 2023), and recent proposals embed economic evaluation directly into enterprise data pipelines so that value realisation is measured continuously rather than retrospectively (Ogundairo & Ayivi-Donkor, 2023). Standardised reporting and decision workflows further improve data quality and therefore the reliability of benefit measurement (Alieme et al., 2022). KPI frameworks that assign accountability and align functions around shared indicators have been shown to improve performance in larger organisations (Sakyi et al., 2022; Seyi-Lande et al., 2022), and integrated data visualisation supports continuous performance monitoring (Ogbole et al., 2021; Babatope et al., 2023). Technology-enabled and risk-based internal audit approaches offer a further model for independent post-implementation verification (Akomolafe & Agu, 2018; Akomolafe et al., 2023).

3.7 Investment Readiness

The term "investment readiness" has its origins in the entrepreneurial finance literature, where it describes whether a business is in a condition to attract and absorb external equity (Mason & Harrison, 2001; Douglas & Shepherd, 2002). A related strand on e-readiness, developed in the context of e-commerce adoption in developing countries, distinguishes perceived organisational e-readiness from the readiness of the external environment (Molla & Licker, 2005). This paper extends the concept inward: an SME is "ready" for a digital investment when its maturity, appraisal discipline, implementation capacity and benefits management are sufficient to give a reasonable probability that forecast returns will be realised. The extension matters because the same conditions that make a digital project likely to succeed also make the firm more credible to banks, investors and grant bodies. The readiness concept has recently been applied to AI adoption in SMEs, where Alieme et al. (2023) propose assessment criteria and a phased implementation pathway, an approach closely aligned with the staged logic adopted in this paper.

3.8 Theoretical Background

The framework draws on five complementary theoretical lenses. Each explains a different part of the causal chain from advisory input to financial return.

3.8.1 Resource-Based View

The resource-based view holds that sustained performance differences arise from resources that are valuable, rare, inimitable and well organised (Barney, 1991). Digital technologies themselves are increasingly commoditised and widely available, so their contribution to performance depends on the complementary resources with which they are combined (Bharadwaj, 2000; Melville et al., 2004). This explains why the same software package can produce very different returns in two otherwise similar SMEs, and it justifies treating maturity and capacity as determinants of value rather than as background context. The RBV has been extended to IT through work showing that technology on its own rarely confers lasting advantage, while managerial IT skills and the combination of IT with human and business resources can (Mata et al., 1995; Powell & Dent-Micallef, 1997; Wade & Hulland, 2004). Absorptive capacity theory complements this view by explaining why a firm's prior knowledge determines its ability to recognise, assimilate and apply new external knowledge, including technology and advice (Cohen & Levinthal, 1990; Zahra & George, 2002).

3.8.2 Dynamic Capabilities

Dynamic capabilities theory (Teece, 2007) focuses on the processes through which firms sense opportunities, seize them through investment, and reconfigure assets and routines. Digital transformation is a reconfiguration process. In the DIRR Framework, digital maturity corresponds broadly to sensing, investment appraisal to seizing, and implementation capacity and benefits tracking to reconfiguring and learning. Advisers can be understood as an external source of dynamic capability that SMEs "borrow" until they build their own. Dynamic capabilities have been characterised as identifiable organisational routines (Eisenhardt & Martin, 2000) and as the source of firms' ability to integrate, build and reconfigure competences in changing environments (Teece et al., 1997). Warner and Wäger (2019) show that digital transformation requires specific digital sensing, seizing and transforming capabilities that are built through an ongoing process of strategic renewal.

3.8.3 Technology-Organisation-Environment (TOE) Framework

The TOE framework (Tornatzky & Fleischer, 1990) explains adoption through technological, organisational and environmental contexts. It is widely used in SME adoption studies (Iacovou et al., 1995; Zhu & Kraemer, 2005). The framework helps to structure the digital maturity pillar so that it covers not only internal technology and organisation but also environmental pressures such as customer expectations, supply chain requirements and regulation. Firm-level adoption reviews confirm the value of combining TOE with diffusion of innovation theory (Oliveira & Martins, 2011; Rogers, 2003), and SME e-commerce studies identify perceived benefits, organisational readiness and external pressure as the strongest predictors (Grandon & Pearson, 2004; Cragg & King, 1993). Supply chain pressures are especially relevant: customers increasingly demand end-to-end visibility, resilience and lean practices from their suppliers (Nnabueze et al., 2021; Anene, 2021; Ike et al., 2022). At the individual level, perceived usefulness and ease of use shape staff acceptance of new systems (Davis, 1989; Venkatesh et al., 2003), which is why the people and culture dimension is included in the maturity pillar.

3.8.4 Real Options Reasoning

Real options theory (Dixit & Pindyck, 1994; Benaroch & Kauffman, 1999) supplies the logic for stage-gate decisions. When readiness is low, the value of waiting or of a small pilot rises, because the pilot generates information and builds capability before the larger commitment is made. The DIRR Framework uses this reasoning to recommend staging rather than outright rejection when readiness, not project merit, is the constraint.

3.8.5 Benefits Management and Organisational Learning

Finally, the benefits management tradition (Ward & Daniel, 2006; Peppard et al., 2007) supplies the post-investment logic. Tracking realised benefits against forecasts closes the loop between ex-ante appraisal and ex-post evaluation and generates the evidence that improves future forecasts. This learning loop is what turns a single project into a cumulative transformation capability.

3.9 Synthesis

Table 1 summarises the four research streams and the gap that the DIRR Framework addresses. Each stream contributes something essential, but none on its own provides a basis for deciding whether an SME should proceed with a given digital investment, under what conditions, and with what kind of advisory support.

Table 1. Research streams informing the framework

Stream	Core contribution	Limitation for SME decisions	Response in DIRR
Digital maturity models	Structured description of capabilities across dimensions	Scores rarely linked to a specific investment or its return	Maturity becomes an input to readiness-adjusted NPV
IT investment appraisal	Financial and multi-criteria evaluation; real options	Forecast benefits assumed achievable regardless of readiness	Benefit realisation factor derived from readiness
Implementation and capabilities	Explains why complements and capabilities drive value	Hard to operationalise in small firms	Five measurable capacity dimensions with gate thresholds
Benefits management	Ownership, dependency networks, post-audit	Seldom used by SMEs; disconnected from appraisal	Benefits register feeds back into future appraisals
SME advisory research	Advice associated with growth and survival	Adviser role not tied to financial outcomes	Advisory functions mapped to each pillar and gate

4. Conceptual Model: The Digital Investment Readiness and Returns (DIRR) Framework

4.1 Overview

The DIRR Framework is shown in Figure 1. It consists of four pillars arranged in a logical sequence, an advisory services layer that interacts with every pillar, an integrating mechanism (the Investment Readiness Index and stage-gate decisions), and an outcome expressed as risk-adjusted financial return and strategic value. A feedback loop carries realised results back into future diagnoses and appraisals.

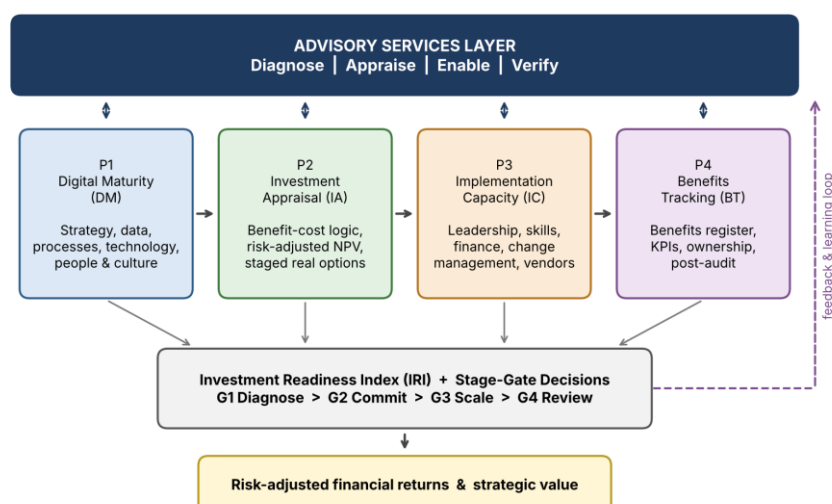


Figure 1. The Digital Investment Readiness and Returns (DIRR) Framework

The central logic of the framework can be stated simply. A digital investment generates value only if (a) the firm is mature enough to use the technology productively, (b) the investment has been appraised realistically, (c) the firm has the capacity to implement the associated change, and (d) benefits are actively managed after go-live. Weakness in any pillar reduces the probability that forecast benefits will be realised. Advisory services add value to the extent that they raise pillar scores, improve the quality of the appraisal, or redesign the investment so that it fits the firm's current readiness.

4.2 Pillar 1: Digital Maturity

Digital maturity captures the firm's current capability to absorb and exploit digital technology. Drawing on Westerman et al. (2014), the TOE framework and SME-specific studies, five dimensions are proposed, each scored on a five-level scale from 1 (ad hoc) to 5 (optimised).

Maturity is not an end in itself. In the DIRR Framework its role is to indicate whether the specific investment under consideration is within the firm's "absorptive reach." A firm at level 2 on data may be ready for a cloud accounting system but not for an advanced analytics platform. Advisers therefore assess maturity relative to the requirements of the proposed project, recording both the current score and the minimum score the project requires.

Table 2. Digital maturity dimensions and indicative indicators

Dimension	What it assesses	Indicative indicators
Strategy and leadership	Whether digital priorities are explicit and linked to business goals	Written digital plan; owner-manager sponsorship; budget allocation
Processes	Degree of standardisation and documentation of core processes	Documented workflows; process cycle times measured; exceptions tracked
Data	Quality, accessibility and use of business data	Single customer/product record; reporting frequency; data-driven decisions
Technology	Fitness and integration of the current technology stack	Cloud adoption; system integration; cybersecurity basics in place
People and culture	Digital skills and openness to change	Share of staff with relevant skills; training hours; past change experience

Process documentation is a particularly important foundation: standard operating procedures act both as strategic assets and as change infrastructure that make digital process redesign possible (Agboada et al., 2019; Eyetsemitan et al., 2022), and lean methods adapted for small enterprises help remove waste before it is automated (Ambali et al., 2021). On the data dimension, integrated data management systems improve forecasting accuracy (Agu et al., 2023) and big data and business intelligence can sharpen operational decisions such as procurement (Akinleye et al., 2023). On the technology dimension, integration between IT systems and core operations matters as much as the systems themselves (Okonkwo et al., 2023), and basic cybersecurity, security audit and data protection practices are a precondition for safe cloud adoption (Dosunmu & Ogundele, 2019; Fadayomi et al., 2019; Okoruwa et al., 2020; Jimoh et al., 2023). The environmental context also includes regulation: SMEs operating digitally must comply with data protection regimes such as the NDPR and GDPR (Ominyi & Anichukwueze, 2022) and with trade and legal requirements that affect market access (Jones & Ominyi, 2020).

4.3 Pillar 2: Investment Appraisal

The investment appraisal pillar assesses the quality of the business case. It does not ask whether the project is attractive, which is the output of the appraisal, but whether the appraisal itself is sound enough to rely upon. Five criteria are scored from 1 to 5:

- **Benefit identification:** benefits are explicit, measurable and linked to specific process changes, following benefits dependency logic (Ward & Daniel, 2006).
- **Cost completeness:** all direct and indirect costs are included, such as licences, integration, data migration, training, temporary productivity loss and ongoing support (Irani & Love, 2002; Oduleye & Medon, 2021; Adesuyi et al., 2023).
- **Financial method:** discounted cash flow measures (NPV, IRR, discounted payback) are applied with an appropriate discount rate rather than simple payback alone.
- **Risk and sensitivity:** key assumptions are stress-tested through scenario or sensitivity analysis (Filani et al., 2023).
- **Flexibility valuation:** opportunities to stage, pilot, scale or abandon are identified and, where material, valued as real options (Benaroch & Kauffman, 1999).

The conventional appraisal produces a nominal NPV based on forecast benefits B_t , costs C_t , initial investment I_0 and discount rate r :

$$NPV_{\text{nominal}} = -I_0 + \sum_{t=1..T} (B_t - C_t) / (1 + r)^t \quad (1)$$

The key innovation of the DIRR Framework is to recognise that forecast benefits are conditional on readiness. A **benefit realisation factor** ρ , between 0 and 1, is applied to forecast benefits, but not to costs, which are largely committed regardless of how well the project is executed:

$$NPV_{\text{readiness-adjusted}} = -I_0 - F_A + \sum_{t=1..T} (\rho \cdot B_t - C_t) / (1 + r)^t \quad (2)$$

where F_A denotes the cost of any advisory services engaged to improve readiness. The realisation factor is derived from the Investment Readiness Index described in Section 4.6. This formulation has three advantages over the common practice of raising the discount rate to reflect risk. It is transparent, because the reader can see how much of the forecast benefit is assumed to be lost. It is asymmetric, because it reduces benefits without inflating the apparent cost of time. And it is actionable, because improving any pillar raises ρ and therefore the expected return, giving a direct financial rationale for advisory interventions. Sensitivity

analysis should include regulatory scenarios, such as changes in tax treatment or levies introduced through finance bills, which can materially alter the cash flows of a digital investment (Akinola et al., 2020).

4.4 Pillar 3: Implementation Capacity

Implementation capacity reflects the firm's ability to carry the project through to effective use. Each dimension corresponds to a recurring finding in the enterprise systems and change literature reviewed in Section 3.5. Five dimensions are scored from 1 to 5:

Table 3. Implementation capacity dimensions

Dimension	Description	Typical warning signs
Leadership and governance	Active sponsorship, clear decision rights, regular review	Owner delegates entirely to vendor; no steering meetings
Skills and champions	Internal staff able to configure, use and support the solution	Single point of knowledge; no time released from daily work
Financial headroom	Funding for the full project cost plus a contingency and the J-curve dip	Project financed from working capital with no buffer
Change management	Communication, training and process redesign plans	Training limited to a vendor demo; old processes left running
Vendor and partner management	Clear contracts, service levels and exit options	Lock-in terms; no acceptance criteria; unclear data ownership

Financial headroom deserves particular emphasis for SMEs. Because productivity often declines before it improves (Brynjolfsson et al., 2021), a firm that funds a project entirely from working capital may be forced to abandon it during the dip, crystallising costs without benefits. Advisers can address this by structuring finance, phasing payments, or identifying grants and supplier credit. Predictive cash flow and working capital models can help advisers size this buffer realistically (Tonoyan et al., 2021b; Oduleye & Medon, 2023a). Vendor dependence is a related risk: clear IT service management and support arrangements are essential for SMEs that rely on external providers (Anyanwu, 2020; Ladapo et al., 2023). Vendor governance and contract negotiation can reduce cost and risk (Okonkwo et al., 2019), and structured supplier

relationship management helps turn suppliers into partners in innovation rather than sources of lock-in (Ike et al., 2021; Akinleye & Adeyoyin, 2022). Capacity planning models help firms anticipate the staff time a project will absorb (Edivri & Oteri, 2022), support quality depends on staff competency (Wikiri, 2021), and training designed to change behaviour, not merely transfer information, is central to adoption (Anichukwueze et al., 2020). Retaining the staff who acquire new digital skills is equally important, which links implementation capacity to employee retention and productivity systems (Falemi et al., 2023). Leadership practices in investment decision-making also matter: inclusive deliberation improves the quality of committee decisions (Oguntegbe et al., 2023).

4.5 Pillar 4: Benefits Tracking

Benefits tracking ensures that forecast benefits are monitored and actively pursued after implementation. Where benefits relate to customers, such as retention or lifetime value, predictive churn analytics provide a ready template for measurement (Oziri et al., 2020). It has four components, each scored from 1 to 5:

- **Benefits register:** a simple record listing each benefit, its measure, baseline, target, owner and review date.
- **Key performance indicators:** a small set of leading indicators (for example, system usage, process cycle time) and lagging indicators (for example, cost per order, revenue per employee, gross margin).
- **Ownership and accountability:** each benefit is assigned to a named person with authority to make the necessary changes (Peppard et al., 2007).
- **Review and post-audit:** scheduled reviews at 3, 6, 12 and 24 months compare realised with forecast benefits and trigger corrective action.

Benefits tracking performs a dual role. Within a project it raises realisation by focusing attention on outcomes. Across projects it generates the evidence that improves future appraisals: an SME that knows it historically achieved 70 per cent of forecast benefits can use that empirical realisation rate in its next business case. Lifecycle performance management models developed for infrastructure delivery show how data captured during implementation can feed continuous performance review (Adelanwa et al., 2023). The benefits tracking pillar is therefore scored before investment, on the basis of the plan, and re-assessed after go-live, on the basis of practice.

Table 4. Indicative benefits register template

Benefit	Measure	Baseline	Target (Yr 2)	Owner	Review
Faster order processing	Average order cycle time (hours)	48	24	Operations lead	Quarterly
Lower inventory holding	Inventory days	65	45	Finance manager	Quarterly
Reduced rework	Defect rate (%)	4.0	2.5	Production supervisor	Monthly
Higher online sales	Share of revenue from online channel (%)	8	20	Sales lead	Monthly

4.6 Integration: Investment Readiness Index and Stage-Gate Decisions

4.6.1 The Investment Readiness Index

The four pillar scores are combined into a composite Investment Readiness Index on a 0 to 100 scale. Let S_k denote the mean score (1 to 5) of pillar k and w_k its weight, with the weights summing to one. Each pillar score is first normalised to a 0 to 1 range:

$$IRI = 100 \cdot \sum_k w_k \cdot (S_k - 1) / 4, \quad k \in \{DM, IA, IC, BT\} \quad (3)$$

Default weights of 0.25 for digital maturity, 0.25 for investment appraisal, 0.30 for implementation capacity and 0.20 for benefits tracking are proposed. Implementation capacity receives the highest weight because the literature identifies organisational execution as the most frequent cause of IT project failure in SMEs. These weights are starting values for practice and should be recalibrated as empirical data become available or adjusted to project type; for instance, a data analytics project may justify a higher weight on maturity. Composite indices of this kind have been used elsewhere to summarise multi-dimensional capability, for example in measuring post-pandemic supply chain resilience (Efobi et al., 2023).

4.6.2 From readiness to the benefit realisation factor

The realisation factor ρ links the index to the financial appraisal. A simple linear mapping is proposed:

$$\rho = \rho_{\min} + (1 - \rho_{\min}) \cdot \text{IRI} / 100 \quad (4)$$

The parameter $\rho_{\min}$ represents the share of forecast benefits that would be realised even by a firm with minimal readiness, for example because some benefits accrue automatically from the technology. A default of $\rho_{\min} = 0.40$ is used for illustration. This value is an assumption, not an empirical estimate; it is consistent with the general observation that many IT projects deliver substantially less than forecast, and it should be replaced by firm-specific or sector-specific realisation rates derived from benefits tracking data as they accumulate. Where an SME has its own track record, the framework allows advisers to substitute the observed realisation rate directly.

4.6.3 Stage-gate decisions

The IRI and the readiness-adjusted NPV are applied at four decision gates, summarised in Table 5. The gates convert the framework from a scoring exercise into a decision process.

Table 5. DIRR stage-gate decision rules

Gate	Purpose	Decision rule	Primary advisory role
G1 Diagnose	Establish baseline readiness and project fit	Proceed to appraisal if no pillar is below 2.0 and project requirements are within maturity reach; otherwise build capability first	Diagnose: maturity and capacity assessment
G2 Commit	Decide whether to invest and in what form	$\text{IRI} \geq 60$ and readiness-adjusted $\text{NPV} > 0$: proceed in full. IRI 40 to 59 or NPV marginal: stage or pilot. $\text{IRI} < 40$ or $\text{NPV} < 0$ after interventions: defer or redesign	Appraise: business case, risk, finance structuring
G3 Scale	Decide whether to expand after pilot	Scale if pilot realisation $\geq 70\%$ of forecast and leading KPIs on track	Enable: change support, skills, vendor management
G4 Review	Verify returns and capture learning	Post-audit at 12 and 24 months; update realisation rate for future appraisals	Verify: benefits review and post-audit

The threshold values are proposed for practice and are intended to be tuned. The essential feature is that the decision depends on both readiness and return. A high NPV with low readiness signals a project that is attractive in principle but likely to disappoint in practice; the appropriate response is usually to stage the investment or to improve readiness before committing in full, which is the logic of real options. Stage-gate approaches have a long record in innovation management as a way of controlling risk while preserving growth options (Agyei, 2021).

4.7 The Role of Advisory Services

The framework specifies four advisory functions, each tied to particular pillars and gates. This specification makes it possible to evaluate advisers by their effect on readiness and returns rather than by activity alone.

Table 6. Advisory functions mapped to the framework

Function	Activities	Pillars affected	Measurable effect
Diagnose	Maturity assessment; requirements fit; capacity review	DM, IC	Accurate baseline; avoided misfit investments
Appraise	Benefit mapping; full costing; DCF and sensitivity; option design; finance sourcing	IA, IC (finance)	Higher IA score; better-structured projects; access to funding
Enable	Change plans; training; vendor selection and contracting; interim project management	IC, DM	Higher IC score; higher ρ ; reduced delay
Verify	Benefits register; KPI design; post-implementation review	BT	Higher realised benefits; calibrated future forecasts

The framework also clarifies when advice is worth paying for. An advisory intervention is financially justified if the increase in expected benefits it produces exceeds its cost:

$$\Delta\rho \cdot PV(B) > F_A \quad (5)$$

where Δp is the improvement in the realisation factor attributable to the intervention and $PV(B)$ is the present value of forecast benefits. This condition gives SMEs, advisers and public funders a simple test for the value of advisory support and creates a natural basis for outcome-linked advisory contracts. Audit-style controls, such as automated IT general controls and integrated governance and compliance strategies, provide models for how advisers can verify benefits independently and build financial resilience (Mbonu et al., 2022; Akomolafe & Agu, 2019).

4.8 Research Propositions

The framework implies a set of relationships that can be tested empirically. Six propositions are offered:

- **P1:** Among SMEs undertaking comparable digital investments, a higher Investment Readiness Index is positively associated with the ratio of realised to forecast benefits.
- **P2:** The effect of digital investment on SME financial performance is positively moderated by implementation capacity, such that the same investment yields higher returns in firms with greater capacity.
- **P3:** Advisory services improve realised returns primarily through their effect on readiness (indirect effect via the IRI) rather than through direct effects on the technology choice.
- **P4:** SMEs that stage digital investments when readiness is moderate realise higher risk-adjusted returns than those that commit fully at the same readiness level.
- **P5:** The presence of a benefits register with named owners is positively associated with benefit realisation, independent of digital maturity.
- **P6:** Advisory engagements that continue through the benefits tracking phase produce higher realised returns than engagements that end at the investment decision.

4.9 Illustrative Application

4.9.1 Case Context

To demonstrate the framework, consider a hypothetical manufacturing SME, referred to here as "Firm A," with 45 employees producing packaged food products for regional retailers. The owner-manager is considering a cloud-based enterprise resource planning (ERP) system integrated with an e-commerce ordering portal. A vendor proposal estimates an initial investment of USD 120,000 (licences, configuration, data migration and hardware) and annual running costs of USD 18,000. The forecast benefits, based on reduced order processing time,

lower inventory, less rework and growth in online orders, are shown in Table 7. The firm uses a discount rate of 12 per cent and a five-year horizon. All figures are illustrative. The forecast reduction in order cycle time is in line with the improvements reported for lean process redesign in small firms (Oyeleye et al., 2022). Similarly, the inventory and e-commerce benefits are consistent with evidence on data-driven lean supply chains in manufacturing and retail (Efobi et al., 2022), predictive demand forecasting for inventory (Aifuwa et al., 2020; Akin-Oluyomi et al., 2023), ERP-based procurement processes (Ahiaeke Patrick et al., 2020) and cloud analytics for e-commerce reliability (Mayo et al., 2021).

Table 7. Forecast benefits and costs, Firm A (USD)

Item	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Initial investment	-120,000					
Forecast benefits		40,000	75,000	95,000	100,000	100,000
Running costs		-18,000	-18,000	-18,000	-18,000	-18,000
Net cash flow (nominal)	-120,000	22,000	57,000	77,000	82,000	82,000

4.9.2 Step 1: Conventional Appraisal

On the vendor's assumptions, the project appears highly attractive. Applying Equation (1) yields a nominal NPV of **USD 98,531**, an internal rate of return of **35.7 per cent** and a payback period of approximately **2.5 years**. On a conventional appraisal, the owner-manager would likely proceed.

4.9.3 Step 2: Readiness Diagnosis (Gate G1)

An adviser conducts a DIRR diagnosis. The results are summarised in the "baseline" column of Table 8. Firm A has basic accounting software and a website, but processes are largely undocumented, inventory data are kept in spreadsheets, and staff have limited digital skills (DM = 2.4). The vendor business case omits data migration effort, training time and productivity loss, and uses only payback (IA = 2.0). The owner intends to finance the project from working capital, no internal champion has been designated, and there is no change plan (IC = 2.2). No mechanism exists to track benefits after go-live (BT = 1.6).

Table 8. Pillar scores and Investment Readiness Index, before and after advisory intervention

Pillar	Weight	Baseline score (1-5)	Post-intervention score (1-5)	Main intervention
Digital maturity (DM)	0.25	2.4	2.8	Inventory data cleansed; core order process documented
Investment appraisal (IA)	0.25	2.0	3.6	Full costing; DCF with sensitivity; phased option designed
Implementation capacity (IC)	0.30	2.2	3.2	Champion appointed; change and training plan; asset finance arranged; vendor contract renegotiated
Benefits tracking (BT)	0.20	1.6	3.4	Benefits register with owners; KPI dashboard; review schedule
Investment Readiness Index		27.0	56.0	
Realisation factor ρ ($\rho_{\min} = 0.40$)		0.562	0.736	

Using Equation (3), the baseline IRI is 27.0, well below the threshold of 40 at which Gate G2 would allow commitment. Equation (4) gives a benefit realisation factor of 0.562, meaning that on current readiness the firm can be expected to capture only around 56 per cent of the forecast benefits.

4.9.4 Step 3: Readiness-Adjusted Appraisal

Applying the realisation factor to forecast benefits (Equation 2) changes the picture fundamentally. The results are shown in Table 9.

Table 9. Comparison of appraisal results (USD, 12% discount rate, 5 years)

Scenario	IRI	ρ	Advisory fee	NPV	IRR	Payback (years)
A. Conventional (nominal)	n/a	1.000	0	98,531	35.7%	2.5
B. Readiness-adjusted, no intervention	27.0	0.562	0	-25,605	4.5%	4.5
C. Readiness-adjusted, after advisory intervention	56.0	0.736	15,000	8,709	14.1%	3.6

Note: Payback is simple (undiscounted) payback. Scenario C includes the advisory fee in the Year 0 outflow. Figures are illustrative and were computed from the cash flows in Table 7.

Under Scenario B the project destroys value: the readiness-adjusted NPV is **USD -25,605** and the IRR of 4.5 per cent falls well below the cost of capital. The difference of more than USD 124,000 between Scenarios A and B is the "readiness gap," the value that the owner-manager would expect to receive but would be unlikely to realise.

4.9.5 Step 4: Advisory Intervention and Gate G2 Decision

Rather than rejecting the project, the adviser designs a programme of interventions costing USD 15,000, listed in Table 8. These raise the IRI to 56.0 and the realisation factor to 0.736. Even after paying the advisory fee, the readiness-adjusted NPV becomes positive at **USD 8,709**, with an IRR of 14.1 per cent. The advisory intervention passes the test in Equation (5): the improvement in the realisation factor (0.174) multiplied by the present value of forecast benefits (approximately USD 283,400) yields about USD 49,300 in expected benefit, far exceeding the USD 15,000 fee.

Because the post-intervention IRI of 56.0 lies in the 40 to 59 band, Gate G2 recommends a **staged commitment** rather than a full roll-out. The adviser therefore restructures the project: Phase 1 implements the ERP core (finance, inventory and order processing), and Phase 2, the e-commerce portal, is held as an option to be exercised at Gate G3 if Phase 1 achieves at least 70 per cent of its forecast benefits within nine months. This staging reduces downside exposure and creates real option value that is not captured in the single-stage NPV above, so the figure of USD 8,709 should be treated as a conservative estimate.

4.9.6 Step 5: Benefits Tracking and Review (Gates G3 and G4)

After go-live, the benefits register (Table 4) is reviewed quarterly. Leading indicators such as the share of orders processed through the new system and the accuracy of inventory records are monitored monthly to give early warning. At the 12-month and 24-month post-audits, the realised benefits are compared with the forecast. The resulting empirical realisation rate replaces the assumed ρ in Firm A's next digital business case, so that each project improves the accuracy of the next. Robust financial reporting models that strengthen compliance and accountability (Medon & Oduleye, 2022) help ensure that the realised figures fed into these reviews are reliable.

5. Discussion

The illustration yields three observations. First, conventional appraisal can make a poorly prepared SME look like an excellent investment candidate; the readiness adjustment exposes this risk before money is committed. Second, readiness is not a fixed attribute; targeted, relatively low-cost advisory interventions can convert a value-destroying project into a value-creating one. Third, the framework turns the adviser's contribution into a quantifiable financial effect, which supports better contracting between SMEs and advisers and better evaluation of publicly funded support programmes.

These observations are consistent with the wider evidence synthesised in Section 3. The gap between nominal and readiness-adjusted returns mirrors the finding that the value of IT depends on complementary organisational resources (Melville et al., 2004; Powell & Dent-Micallef, 1997) and that returns to digital investment may be delayed by a productivity J-curve (Brynjolfsson et al., 2021). The effect of advisory intervention on the realisation factor is consistent with evidence that external expertise improves information systems implementation in small businesses (Thong et al., 1996; Soh et al., 1992), and the staged commitment recommended at Gate G2 reflects the value of managerial flexibility under uncertainty (Benaroch & Kauffman, 1999; Fichman, 2004).

The model also clarifies when a full readiness assessment is worthwhile. It is most useful where the investment is large relative to the firm's resources, partly irreversible and dependent on organisational change, as with ERP, e-commerce or analytics projects. For small, reversible subscriptions with low switching costs, a lighter diagnosis focused on implementation capacity and benefits ownership may be sufficient. More generally, readiness and return should be read

as jointly determined rather than sequential: the decision gates allow the scope of an investment to be adjusted to the firm's readiness, and the benefits tracking loop means that the model becomes more accurate the more it is used, as empirical realisation rates replace assumed parameters.

6. Implications

6.1 Theoretical Implications

For theory, the DIRR Framework has three implications. First, it operationalises the complementarity argument of the IT business value literature (Melville et al., 2004; Brynjolfsson & Hitt, 2000) at the level of the individual investment decision. Instead of treating complements as an explanation after the fact, it treats them as measurable inputs to the ex-ante appraisal. Second, it bridges the maturity model and investment appraisal literatures, which have developed largely in isolation, by specifying a functional link (the realisation factor) between them. Third, it reframes the role of advisory services from a generic knowledge resource (Chrisman & McMullan, 2004) to a specific set of capability-building functions whose effect can be traced through readiness to financial returns. In dynamic capabilities terms, advisers supply temporary sensing, seizing and reconfiguring capacity that the SME gradually internalises. Absorptive capacity theory explains why this internalisation is gradual: firms can only absorb external knowledge that connects to what they already know (Cohen & Levinthal, 1990).

6.2 Implications for Advisers

For accountants, consultants and digital hub staff, the framework provides a structured engagement model. It encourages advisers to begin with diagnosis rather than solution selection, to challenge vendor business cases, to design staged investments, and to remain engaged through benefits review. It also offers a basis for value-based or outcome-linked pricing, because the effect of an engagement on the realisation factor and readiness-adjusted NPV can be estimated in advance and verified later. Accountants, who already hold trusted relationships and financial data for most SMEs, are particularly well positioned to deliver the appraisal and verification functions. Evidence that structured financial analysis contributes to enterprise growth (Oduleye & Medon, 2023b) reinforces the case for advisers taking an active role in appraisal.

6.3 Implications for SME Owner-Managers

For owner-managers, the framework offers a practical discipline: ask not only "Is this project worth it?" but also "Are we ready to make it worth it?" The diagnostic instrument in the Appendix can be used as a self-assessment before approaching vendors or advisers. The benefits register, kept deliberately simple, gives owner-managers a low-cost way to hold suppliers, staff and advisers accountable for outcomes. Cloud services lower the cost of this discipline: scalable cloud infrastructure and standard productivity suites allow small firms to start with modest deployments and grow them as benefits are confirmed (Odejobi & Ahmed, 2018; Ahmed et al., 2020), and process automation in functions such as procurement can deliver early, measurable gains (Akinleye & Adeyoyin, 2021; Akokodaripon et al., 2023).

6.4 Implications for Lenders, Investors and Policymakers

Banks and investors can use the IRI as a structured, non-financial indicator of the likelihood that a digital investment will generate the cash flows needed for repayment or return, extending the investment readiness concept (Mason & Harrison, 2001) into technology finance. The growth of fintech-enabled digital lending to SMEs (Okafor et al., 2021) offers a practical channel through which readiness information could inform credit decisions. Relationship banking models that grow portfolios through closer knowledge of clients (Ezeako et al., 2019) could use the IRI as part of that knowledge, and venture investors already apply portfolio risk optimisation that could incorporate readiness as a risk factor (Eboh & Aliliele, 2023). Policymakers designing SME digitalisation programmes can use the framework to target support at the pillars where firms are weakest, to tie voucher or grant funding to readiness thresholds, and to evaluate programmes by changes in readiness and realised returns rather than by uptake alone. The advisory value test in Equation (5) provides a simple basis for assessing the cost-effectiveness of subsidised advice.

7. Limitations

The study has several limitations that should be borne in mind when interpreting the model and its illustration.

- **Conceptual status:** the model has been developed from the literature and has not yet been tested empirically. Its constructs, relationships and decision rules are therefore propositions rather than established findings.

- **Hypothetical illustration:** the application in Section 4.9 uses constructed figures to demonstrate the mechanics of the model. It shows how the model works, not how well it predicts realised returns.
- **Assumed parameters:** the pillar weights, the decision thresholds and the parameter $\rho_{\min}$ are proposed starting values rather than estimates, and the results of the illustration are sensitive to them.
- **Functional form:** the linear relationship between the IRI and the realisation factor is a simplification. In practice, very low capacity in a single pillar may cap realisation regardless of strength elsewhere.
- **Scoring subjectivity:** pillar scores depend on adviser judgement, which may vary between assessors, and advisers who also sell or implement technology may face conflicts of interest that affect the objectivity of their assessments.
- **Context:** the illustration reflects a manufacturing SME. Service firms, micro-enterprises and firms in emerging economies, where infrastructure, finance and regulatory constraints differ, may require different dimensions and indicators, including sustainability and ESG requirements increasingly imposed through supply chains (Akinleye, 2023).

8. Future Research

The limitations above point to a programme of further work.

- **Empirical validation:** the propositions in Section 4.8 should be tested through longitudinal studies that track SME digital investments from appraisal through to realised outcomes. Multi-case studies would be valuable in the first instance, followed by survey-based structural equation modelling across larger samples. Data-driven operations management frameworks developed for other sectors offer useful templates for designing such measurement programmes (Efobi et al., 2021).
- **Calibration:** empirical work should estimate the pillar weights, decision thresholds and realisation parameters, differentiating where necessary by sector, firm size, country context and project type.
- **Alternative functional forms:** non-linear and threshold specifications of the link between readiness and benefit realisation should be compared with the linear form proposed here.

- **Measurement reliability:** inter-rater reliability studies and anchored rating scales for the diagnostic instrument would improve the consistency of pillar scores.
- **Advisory governance:** research could examine how contracting, independence and outcome-linked fee arrangements affect the objectivity and value of advisory engagements.
- **Contextual adaptation:** the model should be adapted and tested for service firms, micro-enterprises and SMEs in different institutional settings, including emerging economies.

9. Conclusion

SMEs are investing in digital technologies at an unprecedented rate, but the returns depend heavily on whether firms are ready to absorb those technologies and manage their benefits. This paper has developed the Digital Investment Readiness and Returns (DIRR) Framework to connect digital maturity, investment appraisal, implementation capacity and benefits tracking into a single decision logic, with advisory services acting as an enabling layer across the investment lifecycle.

The framework's central idea is that readiness should be built directly into the financial appraisal of a digital investment, through a benefit realisation factor derived from a composite Investment Readiness Index. This makes visible the gap between the return an SME is promised and the return it is likely to achieve, and it shows how targeted advisory interventions can close that gap. Combined with staged decision gates and a benefits tracking loop that improves future forecasts, the framework offers advisers, owner-managers, financiers and policymakers a shared, auditable language for digital investment decisions. Empirical validation and calibration are the essential next steps, and the propositions and diagnostic instrument presented here are intended to make that research programme possible.

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Appendix A. DIRR Diagnostic Instrument

Each item is rated on a five-point scale: 1 = not in place; 2 = informal or partial; 3 = defined and applied in some areas; 4 = consistently applied and measured; 5 = optimised and continuously improved. The pillar score is the mean of its items.

Table A1. Diagnostic items

Code	Pillar	Item	Score (1-5)
DM1	Digital maturity	The business has a written plan stating how digital technology supports its goals.	
DM2	Digital maturity	Core processes (ordering, production or service delivery, invoicing) are documented.	
DM3	Digital maturity	Key business data are accurate, held in one place and used for decisions.	
DM4	Digital maturity	Existing systems are integrated and basic cybersecurity controls are in place.	
DM5	Digital maturity	Staff have the digital skills needed for their roles and receive regular training.	
IA1	Investment appraisal	Each expected benefit is defined, measurable and linked to a specific change.	
IA2	Investment appraisal	All direct and indirect costs, including training and productivity loss, are included.	
IA3	Investment appraisal	NPV, IRR or discounted payback is calculated using an appropriate discount rate.	
IA4	Investment appraisal	Key assumptions are tested through sensitivity or scenario analysis.	
IA5	Investment appraisal	Options to pilot, stage, scale or exit have been identified and considered.	
IC1	Implementation capacity	The owner-manager actively sponsors the project and reviews progress regularly.	
IC2	Implementation capacity	A named internal champion has time allocated to the project.	

Code	Pillar	Item	Score (1-5)
IC3	Implementation capacity	Funding covers the full cost plus a contingency and a period of lower productivity.	
IC4	Implementation capacity	A change, communication and training plan exists.	
IC5	Implementation capacity	Vendor contracts include service levels, acceptance criteria and exit terms.	
BT1	Benefits tracking	A benefits register records each benefit, its baseline, target and owner.	
BT2	Benefits tracking	A small set of leading and lagging KPIs is defined and reported.	
BT3	Benefits tracking	Each benefit has a named owner with authority to act.	
BT4	Benefits tracking	Reviews at defined intervals compare realised and forecast benefits.	

Appendix B. Computational Summary

The steps used to compute the readiness-adjusted return are as follows:

- Compute the mean score S_k for each pillar from the diagnostic items.
- Compute $IRI = 100 \cdot \sum w_k (S_k - 1)/4$ using default weights DM 0.25, IA 0.25, IC 0.30, BT 0.20.
- Compute $\rho = \rho_{\min} + (1 - \rho_{\min}) \cdot IRI/100$, with $\rho_{\min} = 0.40$ by default or the firm's observed realisation rate where available.
- Compute readiness-adjusted NPV $= -I_0 - F_A + \sum (\rho \cdot B_t - C_t)/(1 + r)^t$.
- Apply the Gate G2 rules in Table 5 to decide whether to proceed, stage, defer or redesign.
- Test advisory value using $\Delta\rho \cdot PV(B) > F_A$.