

جامعة ميدأوشن

كلية الإدارة

قسم / تخصص ماجستير إدارة الأعمال



(SMC) أثر التحول الرقمي على الأداء التنظيمي: دراسة حالة لشركة رياضة المحركات السعودية
في المملكة العربية السعودية

إعداد الطالب/

صالح نادي زهران طرفاوي

الرقم الأكاديمي / 253002801

إشراف/

د. الفیصل عبد الحمید

د. فايز جراد

العام الدراسي:

2026

MIDOCEAN UNIVERSITY

COLLEGE OF MANAGEMENT

**DEPARTMENT OF MASTER OF BUSINESS
ADMINISTRATION**



**THE IMPACT OF DIGITAL TRANSFORMATION ON ORGANIZATIONAL
PERFORMANCE: A CASE STUDY OF THE SAUDI MOTORSPORT COMPANY
(SMC) IN THE KINGDOM OF SAUDI ARABIA**

PREPARED BY:

SALEH NADY ZAHRAN TARFAWY

SUPERVISED BY:

DR. ALFAISAL ABDELHAMID

DR. FAYEZ JRAD

YEAR:2026

TABLE OF CONTENT

ABSTRACT.....	v
ACKNOWLEDGEMENTS.....	vii
APPROVAL.....	viii
DECLARATION.....	ix
LIST OF ABBREVIATIONS	x
LIST OF TABLES:	xiv
CHAPTER ONE	1
INTRODUCTION	1
1.1. Background	2
1.2. Statement of the Problem	3
1.3. Research Objectives	5
1.4. Research Questions	5
1.4.1. Primary Research Question:	5
1.4.2. Sub-Questions:.....	6
1.5. Research Hypotheses	6
1.6. Significance of the Study	7
1.7. Scope and Limitations.....	8
1.8. Definition of Key Terms	9
1.9. Structure of the Thesis.....	10
LITERATURE REVIEW.....	13
2.1 Introduction to the Chapter	14
2.2 Theoretical Foundations.....	14
2.2.1 The Resource-Based View (RBV).....	14
2.2.2 Dynamic Capabilities Theory (DCT)	15
2.2.3 Integrating RBV and DCT.....	15
2.2.4 Conceptual Framework.....	15

2.3 Digital Transformation: Concepts, Dimensions, and Drivers	18
2.3.1 Defining Digital Transformation	18
2.3.2 Key Dimensions of Digital Transformation	20
2.3.3 Drivers, Barriers, and Maturity Models.....	20
2.4 Digital Transformation and Organizational Performance	21
2.4.1 Conceptualizing Organizational Performance	21
2.4.2 Digital Transformation and Operational Performance	21
2.4.3 Digital Transformation and Financial Performance	23
2.4.4 Digital Transformation and Competitive Performance	23
2.4.5 Mediating and Moderating Factors.....	23
2.5 Digital Transformation in the Saudi Arabian Context.....	26
2.5.1 Vision 2030 and the National Digital Agenda	26
2.5.2 Empirical Evidence from Saudi Organizations	26
2.5.3 Barriers and Enablers in the Saudi Context.....	27
2.6 Digital Transformation in the Sports Industry	28
2.6.1 Overview of Digital Transformation in Global Sports Management	28
2.6.2 Key Technologies Reshaping Sports Organizations.....	28
2.6.3 Digital Transformation and Performance in Sports Organizations.....	29
2.6.4 Digital Transformation in Saudi and GCC Sports Organizations	29
2.7 Research Gaps, Conceptual Framework, and Study Positioning.....	32
2.7.1 Summary of Identified Research Gaps	32
2.7.2 The Study's Conceptual Framework.....	34
2.7.3 Chapter Conclusion and Gap Summary	34
METHODOLOGY	35
3.1 Introduction	36
3.2 Research Philosophy	36
3.3 Research Design.....	36

3.4 Population and Sampling Strategy	38
3.4.1 Study Population.....	38
3.4.2 Census Approach — Rejection of Probability Sampling Formulas	38
3.5 Data Collection Methods.....	39
3.5.1 Quantitative — EDTQ Questionnaire	39
3.5.2 Qualitative — Semi-Structured Interviews and Open-Ended Questions	39
3.5.3 Document Analysis.....	39
3.6 Research Instrument: The EDTQ Questionnaire	40
3.7 Data Analysis	46
3.8 Validity, Reliability, and Trustworthiness.....	47
3.9 Ethical Considerations	47
3.10 Chapter Summary and Methodological Gap.....	48
RESULTS AND DISCUSSION.....	50
4.1 Introduction.....	51
4.2 Demographic Profile of Respondents	51
4.3 Descriptive Statistics and Scale Reliability.....	52
4.3.1 Section-Level Descriptive Statistics.....	52
4.3.2 Internal Consistency — Cronbach's Alpha.....	54
4.4 ANOVA Analysis.....	55
4.5 Frequency Distribution and Response Patterns.....	68
4.6 Highest and Lowest Scoring Items	69
4.7 Pearson Correlation Matrix	70
4.8 Hypothesis Testing	71
4.9 Discussion of Findings in Relation to Literature	74
4.10 Summary	74
CONCLUSION AND RECOMMENDATIONS	76
5.1 Summary	77

5.2 Thesis Conclusion	79
5.3 Contributions of the Study	80
5.4 Recommendations	81
REFERENCES	82
APPENDIX A	Error! Bookmark not defined.
BIODATA OF THE STUDENT	96

ABSTRACT

Digital transformation is the strategic imperative that characterizes organizations operating in dynamic, technology intensive environments. The aim of this master's thesis is to study the effects of digital transformation on the organizational performance of the Saudi Motorsport Company (SMC), the main institutional vehicle for the development of motorsport in the Kingdom of Saudi Arabia, in the framework of Saudi Arabia's Vision 2030 national reform agenda. Underpinned by an integrated theoretical framework combining the Resource-Based View (RBV) with Dynamic Capabilities Theory (DCT), the study conceptualizes digital transformation as a process through which SMC accumulates strategically valuable digital resources and develops higher-order organizational capabilities – sensing, seizing and reconfiguring – that translate those resources into operational, financial and competitive performance outcomes.

A mixed-methods single case study design is used and the Engineering Department (N=16 employees across Facility Management, Design and Technical Operations sub-departments) is selected as the unit of analysis through purposive census sampling. Data were collected through a purpose-built 70-item questionnaire (the Engineering Department Digital Transformation Questionnaire, EDTQ), semi-structured interviews and systematic document analysis. The main tool of digital transformation examined is the Oracle enterprise system, which has been in place for HR services since 2023 and procurement and financial services since 2024, representing SMC's transition from email- and personal contact-based workflows to integrated digital operations.

Five hypotheses are tested: H1: Direct effect of digital transformation on operational performance. H2: Direct effect of digital transformation on financial performance. H3: Direct effect of digital transformation on competitive performance. H4: Mediating role of organizational dynamic capabilities. H5: Moderating effect of Vision 2030 strategic alignment. We anticipate to observe strong positive relations between all three performance dimensions, mediated by sensing, seizing and reconfiguring capabilities, and amplified by the institutional alignment of Vision 2030.

The paper offers a novel theoretical, empirical and practical contribution by extending the RBV-DCT integration to the motorsport organizational setting, providing the first case-level evidence on Oracle-enabled digital transformation in a Saudi sports organization and offering

actionable strategic recommendations for SMC leadership and GCC sports governance authorities interested in digital transformation in line with Vision 2030.

Keywords:

Digital Transformation; Organizational Performance; Saudi Motorsport Company (SMC); Resource-Based View; Dynamic Capabilities Theory; Vision 2030; Oracle ERP; Mixed-Methods Case Study; Sports Management; Saudi Arabia

ACKNOWLEDGEMENTS

الشكر والتقدير

الحمد لله أولاً وآخراً، له الفضل والمنة، الذي بنعمته تتم الصالحات، وبتوقيفه أنجز هذا البحث.

أتقدم بخالص الشكر والتقدير إلى زوجتي الغالية، التي كانت السند الحقيقي طوال هذه الرحلة الأكاديمية. فقد أحاطتني بدعمها اللامحدود، وصبرها، وتشجيعها المستمر، وتحملت الكثير من الأعباء لتوفر لي البيئة المناسبة لإتمام هذا العمل. وكان لإيمانها بقدراتي وثقتها الدائمة بي أعظم الأثر في تجاوز التحديات ومواصلة المسيرة حتى إنجاز هذا البحث، فجزاها الله عني خير الجزاء.

كما أتقدم بجزيل الشكر والتقدير إلى الدكتور أحمد حسن سعد، زميلي في العمل، على دعمه الكريم ومساعدته القيمة في مراحل البحث، وما قدمه من آراء علمية وملاحظات بناءة، إضافة إلى جهوده في المساعدة في البحث وجمع المعلومات، والتي كان لها أثر واضح في إثراء هذا العمل وتحسين جودته. فله مني خالص الشكر والامتنان.

وأتقدم بخالص الشكر والعرفان إلى جامعة ميدأوشن، لما وفرتة من بيئة أكاديمية متميزة، ودعم علمي، وموارد وتسهيلات أسهمت بشكل كبير في إنجاز هذا البحث.

كما أعبر عن بالغ تقديري وامتناني لمشرفي الكريمين الدكتور الفيصل عبد الحميد محمد والدكتور فايز علي جار، على توجيهاتهما العلمية السديدة، وملاحظاتهم القيمة، ودعمهما المستمر طوال مراحل إعداد الدراسة. لقد كان لخبرتهما الأكاديمية وإرشاداتهما أثر بالغ في تطوير البحث وصياغته بالشكل الذي وصل إليه.

ولا يفوتني أن أتقدم بالشكر الجزيل إلى السادة المحكمين للاستبيان، لما قدموه من ملاحظات علمية أسهمت في تطوير أداة الدراسة، كما أشكر جميع أفراد عينة البحث على تعاونهم واستجابتهم، والتي كانت ركيزة أساسية لإنجاز هذه الدراسة.

كما أتوجه بالشكر والتقدير إلى جميع الباحثين والمؤلفين الذين أسهمت مؤلفاتهم ودراساتهم السابقة في بناء الإطار النظري والمنهجي لهذا البحث، وكانت أعمالهم مرجعاً علمياً مهماً استفدت منه خلال إعداد الدراسة.

وفي الختام، أتقدم بالشكر والامتنان إلى كل من دعمني وساندني، سواءً بصورة مباشرة أو غير مباشرة، وسأهم بكلمة طيبة أو نصيحة أو تشجيع خلال هذه الرحلة الأكاديمية. إن هذا الإنجاز لم يكن ليتحقق بعد توفيق الله إلا بتكاتف جهود الكثير من الأشخاص، وأسأل الله أن يجزيهم جميعاً خير الجزاء.

الباحث

APPROVAL

DECLARATION

LIST OF ABBREVIATIONS

ABV	Algorithmic-Based View
AI	Artificial Intelligence
API	Application Programming Interface
BI	Business Intelligence
BSC	Balanced Scorecard
CFA	Confirmatory Factor Analysis
CP	Competitive Performance
CRM	Customer Relationship Management
CSR	Corporate Social Responsibility
d	Cohen's d
DCT	Dynamic Capabilities Theory
DHC	Digital Human Capital
DT	Digital Transformation
DV	Dependent Variable
DX	Digital Transformation (alternative notation)
EBS	Oracle E-Business Suite
EDTQ	Engineering Department Digital Transformation Questionnaire
EPM	Enterprise Performance Management
ERP	Enterprise Resource Planning
ESG	Environmental, Social, and Governance
F1	Formula 1 / Formula One
FE	Formula E
FIA	Fédération Internationale de l'Automobile

FP	Financial Performance
GAS	General Authority for Sport
GCC	Gulf Cooperation Council
HCM	Human Capital Management
HR	Human Resources
IoT	Internet of Things
IRR	Inter-Rater Reliability
IS	Information Systems
ISM	Information Systems Success Model
IT	Information Technology
IT	Information Technology
ITSM	IT Service Management
IV	Independent Variable
JCC	Jeddah Corniche Circuit
KPI	Key Performance Indicator
KSA	Kingdom of Saudi Arabia
MBS	Mohammed bin Salman
MIS	Management Information Systems
MIS	Management Information Systems
ML	Machine Learning
MMR	Mixed-Methods Research
MotoGP	MotoGP
MV	Mediating / Moderating Variable
N	Total Population / Sample Size

OCI	Oracle Cloud Infrastructure
OE	Open-Ended Question
OP	Operational Performance
p	p-value (Statistical Significance)
P2P	Procure-to-Pay
PEOU	Perceived Ease of Use
PIF	Public Investment Fund
PU	Perceived Usefulness
r	Pearson Correlation Coefficient
RBV	Resource-Based View
ROD	Return of Digitalization
ROI	Return on Investment
SaaS	Software as a Service
SCM	Supply Chain Management
SD	Standard Deviation
SDGA	Saudi Digital Government Authority
SEM	Structural Equation Modelling
SLR	Systematic Literature Review
SMC	Saudi Motorsport Company
SPSS	Statistical Package for the Social Sciences
t	t-statistic
TA	Thematic Analysis
TAM	Technology Acceptance Model
TTF	Task–Technology Fit

UX	User Experience
V2030	Vision 2030
VRIN	Valuable, Rare, Inimitable, Non-substitutable
WEC	World Endurance Championship
α	Cronbach's Alpha

LIST OF TABLES

Table No.	Table Caption	Page
1.1	Overview of Thesis Structure and Chapter Focus	12
2.1	Integrated Conceptual Framework — Digital Transformation, Dynamic Capabilities, Vision 2030, and Organizational Performance at SMC	16
2.2	Comparative Analysis of RBV and DCT in the Digital Transformation Context	17
2.3	Comparative Analysis of Digital Transformation Definitions (2020–2026)	20
2.4	Digital Transformation Dimensional Frameworks Across Key Studies	23
2.5	Comparative Analysis of Empirical Studies on Digital Transformation and Organizational Performance	25
2.6	Comparative Analysis of Dynamic Capabilities Studies in Digital Transformation Research	26
2.7	Comparative Analysis of Digital Transformation Studies in the Saudi Arabian Context	27
2.8	Comparative Analysis of Digital Transformation Studies in the Sports Industry	30
2.9	Comprehensive Research Gap Analysis — Evidence and Study Contributions	32
3.1	Research Design Summary — Elements, Decisions, and Academic Justifications	37
3.2	Section 1 — Demographic Items (D1–D10)	40
3.3	EDTQ Sections 2–8 — Full Questionnaire (Q1–Q55)	41
3.4	EDTQ Construct Map — Item Allocation, Theory, and Hypothesis Linkage	46
4.1	Demographic Profile of Engineering Department Respondents (N=19)	51
4.2	Section-Level Descriptive Statistics, T-Tests, and Effect Sizes (N=19)	52
4.3	Cronbach's Alpha Reliability Estimates by Section	53

4.4	Section-by-section analysis	57
4.5	Detailed item-by-item analysis	57
4.6	Hypothesis testing summary	58
4.7	reverse-coded items analysis (★)	59
4.8	demographic distribution (section 1)	60
4.9	top 5 highest scoring items (most positive responses)	60
4.10	Bottom 5 lowest scoring items (areas for improvement)	60
4.11	Descriptive statistics by section	61
4.12	Frequency distribution (all likert items)	61
4.13	: internal consistency / reliability analysis	62
4.14	Respondent-level analysis (per-person average scores)	63
4.15	Inferential statistics: one-sample t-test (vs. Neutral $\mu_0 = 3.0$)	64
4.16	Correlation matrix (pearson r) — inter-section relationships	64
4.17	Normality assessment (skewness & kurtosis analysis)	65
4.18	Effect size analysis (cohen's d vs. Neutral point 3.0)	65
4.19	Overall statistical profile	66
4.20	Aggregate Frequency Distribution — All 55 Likert Items (Total Responses = 1,045)	67
4.21	Top 5 and Bottom 5 Scoring Items (from EDTQ, N=19)	68
4.22	Pearson Inter-Section Correlation Matrix (N=19)	69
4.23	Hypothesis Testing Summary — H1 to H5 (N=19)	71

CHAPTER ONE
INTRODUCTION

1.1. Background

The rapid technological development of the 21st century has changed the competitive landscape for all businesses and regions. Digital transformation is a complex strategic process that integrates AI, cloud computing, big data analytics, the IoT and automation into all organizational operations (Cosa et al., 2024). Digital transformation is happening in today's companies. Digital transformation, compared to digitization and digitalization, is about rethinking business models, organization structure, value creation and stakeholder relationships (Dašić, 2023; Christodimitropoulou et al., 2025). The event has technological and organizational characteristics.

There have been several reports that have indicated that digital transformation is of strategic importance globally. Cosa et al. (2024) conducted a systematic review of 47 empirical studies and found that organizations undergoing digital transformation had improved decision-making agility, flexible performance measurement systems, and strategic resilience. All these are factors which improve competitive performance. The results of this review were published in 2024. The results of a study conducted by Qi and colleagues in 2024 demonstrated that the consequences of digital transformation, which encompass management information systems and analytics tools, can improve the performance of organizations and the effectiveness of their operations in every sector. Considering this, it becomes crystal clear that digital transformation is an integral part of the future existence and development of modern companies.

Digital transformation has become increasingly important for economic diversification in emerging economies and the Gulf Cooperation Council (GCC). Crown Prince Mohammed bin Salman's national reform program, Vision 2030, has made it a regional leader. Digital transformation is at the core of Vision 2030, which seeks to develop a diversified knowledge-based economy that is less reliant on hydrocarbons (Alnasser et al., 2024). To this end, the Saudi government has made significant investments in digital infrastructure, regulatory modernization, national capacity-building programs for technology and sector-specific digital transformation roadmaps for public services, health care, education, tourism and entertainment. Saudi org data reveals performance improvements from digital transformation spend. Masoud et al. (2023) discovered that digital transformation statistically improves firm performance through the mediation of customer experience and IT innovation in 164 service-sector firms in Saudi Arabia. Customer experience is the most powerful mediating

mechanism. Tripathi et al. (2024) examined Saudi SMEs at Ha'il and observed that awareness and readiness for digital transformation, supported by government incentives and workforce skills development, improve business performance. These findings provide a strong empirical base that endorses the role of digital transformation in enhancing the Saudi institutional performance. Sports and entertainment is one of the strategic growth pillars in Saudi Arabia's Vision 2030. The Saudi government invests in global sporting mega-events like the Formula 1 Saudi Arabian Grand Prix, Formula E, the Dakar Rally and motorsport championships in order to position itself in the global sports economy. The Saudi Motorsport Company (SMC) is the leading body for motorsport in the Kingdom, responsible for event management, commercial partnerships, broadcasting rights, athlete development and fan engagement. SMC is an ideal case study to examine how digital transformation impacts on organizational performance as it is subject to the digital imperatives shaping global sports management and institutional demands of Vision 2030. The global sports industry has been transformed by digital transformation in its competitive strategies, operational models and fan engagement paradigms. As pointed out by Christodimitropoulou et al. (2025), the digital transformation is a strategic necessity for sports management and not merely a technological evolution. Today, big data analytics, AI-based performance optimization, and digital fan engagement platforms are core capabilities. AI-powered fan segmentation, blockchain-based fan engagement mechanisms and data-driven commercial strategies are transforming sports organizations across the globe, Glebova et al. (2025) uncover. As a motorsport company, the technical innovation of SMC is the backbone of both the product and the operations, thus it is critical for academics and managers to understand how digital transformation influences the organizational performance.

1.2. Statement of the Problem

This research filled three significant gaps in the existing body of literature on digital transformation and organizational performance. These are interconnected gaps with implications. This is the situation that has been created although the volume of discourse in both academic and professional settings is slowly on the rise. The empirical literature on digital transformation and organizational performance primarily addresses East Asian economies, especially China and South Korea, in the manufacturing and financial services industries. Moreover, the literature is primarily concentrated on the US. This body of literature has comparatively less focus on the Gulf Arab region and the sports and

entertainment industry. Saudi business environment has attracted scholarly interest in the context of Vision 2030, but the majority of the conducted research has focused on broad sectoral surveys rather than detailed case analyses of organizations (Alnasser et al., 2024; Tripathi, 2024). The majority of the research that has been conducted has been the focus of this. There is a lack of understanding of the mechanisms, enabling conditions and performance impacts associated with digital transformation in Saudi high-tech sports organizations to date. This is a problem of ignorance. According to the research results on digital transformation, it is found that sports organizations, especially motorsport organizations, are not sufficiently studied. This is the situation that has arisen despite the fact that sports organizations have distinctive operational characteristics and are growing in strategic importance in the national economic development agendas. Ahmed et al. (2022) confirm that a small number of studies have been carried out on the topic of digital transformation in Saudi sports facilities. Based on the findings of these studies it has been determined that there is a deficiency in digital maturity as well as evidence that digital transformation initiatives that are managed effectively enhance both productivity and competitiveness. These surveys are useful for tracking macro-level trends, but they do not shed light on organizational processes, contextual moderators, or the capability-building mechanisms that influence digital transformation to impact individual organizational performance. Though these surveys are useful to track trends at macro level. Moreover, to date, no study has applied the Resource Based View (RBV) or the Dynamic Capabilities Theory (DCT) to explain the digital transformation and performance outcomes of sports organizations in Saudi Arabia. Third point. Hsiao (2024) and Civelek et al. (2023) say these frameworks have worked well for digital transformation projects carried out by other kinds of organizations. Together, these two have not been applied to either the Saudi GCC sport management or the motorsport industry's explanatory power. This is particularly the case in terms of their ability to think not just about the strategic value of digital resources but also the higher-order organizational capabilities required to leverage those resources. In this respect, the following questions are being raised by the research currently being carried out: The digital transformation is affecting the organizational performance of the Saudi Motorsport Company (SMC). What is the nature of this impact? What organizational capabilities and contextual factors mediate or moderate the relationship between these two things in the institutional setting of Saudi Arabia's Vision 2030? It is a thing for both the academic community and the real world to gain from it in this particular issue. It contributes to the RBV-DCT theoretical framework in a new organisational and geographical context

and also discusses implications for the field of digital transformation scholarship and the field of sports management. Furthermore, it is related to the field of sports management. It offers evidence-based recommendations to the leadership of the Saudi Sports Council and the Saudi sports governance organizations on organizational conditions that maximize digital investment performance outcomes. This is offered in a practical way. The Kingdom's continued investments in digital infrastructure and sporting mega-events bear testimony to this.

1.3. Research Objectives

The study is structured around four research objectives, each one corresponding to an analytical dimension of the research problem:

1. The purpose of this study is to evaluate the digital transformation implemented by Saudi Motorsport Company (SMC) and the extent to which it aligns with Saudi Arabia's vision 2030 digital transformation agenda.
2. Using both quantitative and qualitative data to analyze the impact of digital transformation on SMC's operational, financial and competitive performance.
3. Based on the Resource-Based View (RBV) and the Dynamic Capabilities Theory (DCT), identify the organizational resources, capabilities and contextual factors that influence the digital transformation and organizational performance experienced by SMC.
4. To present evidence-based recommendations to the Saudi Arabian Sports Council (SMC) and other sports organizations in the GCC region to optimize digital transformation strategies for optimal performance.

The sequence of these objectives is descriptive analysis (Objective 1), causal explanation (Objectives 2 and 3), and prescriptive guidance (Objective 4), and the final aim of these objectives is to generate theoretical knowledge and practical value.

1.4. Research Questions

The investigation is structured around one main research question and four sub-questions that operationalize the investigation along the main analytical dimensions of the study:

1.4.1. The central Research Question:

What is the effect of digital transformation on the organizational performance of Saudi Motorsport Company (SMC)? What are the organizational capabilities and contextual factors that moderate this relationship in the context of Saudi Arabia's Vision 2030?

1.4.2. Sub-Questions:

1. What is the status of digital transformation at SMC and how far does it meet the priorities and objectives of digital transformation as described in Saudi Arabia's Vision 2030 document?
2. How does implementation of digital transformation at SMC have positive effect on operational performance, financial performance and competitive performance?
3. Based on RBV and DCT, what organizational resources mediate and moderate, and what dynamic capabilities and institutional contextual factors affect the relationship between digital transformation and organizational performance in SMC?
4. What are the strategic lessons learned from SMC's digital transformation experience, and how can they be generalized to guide digital transformation strategies for other sports organizations in Saudi Arabia and the GCC region?

1.5. Research Hypotheses

The theoretical frameworks of Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) and the empirical evidence discussed in the problem statement are the basis of the present study. It proposes the following five research hypotheses:

1. Digital transformation has significantly improved the operational performance of the Saudi Motorsport Company (SMC).
2. The second hypothesis is that digital transformation has a positive and significant impact on the financial performance of Saudi Motorsport Company (SMC).
3. The digital transformation that has occurred has been cited as the reason for the improved competitive performance of the Saudi Motorsport Company (SMC).
4. The dynamic organizational capabilities of SMC such as sensing, seizing and reconfiguring moderate the relationship between digital transformation and organizational performance.

5. Strategic Alignment with Saudi Arabia's Vision 2030 moderates the relationship between digital transformation and organizational performance in SMC. This implies that stronger alignment increases the positive performance effects of digital transformation.
6. The H1-H3 hypotheses are based on empirical evidence that digital transformation has positive performance outcomes in terms of operations, finance, and competition (Cosa et al., 2024; Masoud et al., 2023; Qi et al., 2024). These refer to the operational, financial and competitive dimensions.
7. Hypothesis 4 is based on the Dynamic Capabilities perspective that digital transformation can generate performance advantages by developing higher-order organizational capabilities (Hsiao, 2024; Civelek et al., 2023).
8. H5 is an indicator of the institutional setting of the study according to Tripathi et al. (2024) and Alnasser et al. (2024). It recognizes that there is an opportunity to improve the performance returns of digital investment by being aligned with Vision 2030 which can be achieved through access to government support, legitimacy and infrastructure.

1.6. Significance of the Study

The study makes important and clear contributions to three levels of analysis; theoretical, empirical and practical. The significance of theory. This study contributes to the application of the Resource-Based View and the Dynamic Capabilities Theory to the nexus of digital transformation and sports management, a theoretical area that has been integrated to a limited extent so far. The study applies RBV's VRIN framework (Valuable, Rare, Inimitable, Non-substitutable resources) and DCT's sensing-seizing-reconfiguring capability model to the motorsport organizational context, offering fresh theoretical insights into how these frameworks account for performance variation in high-technology, event-driven sports enterprises (Hsiao, 2024; Alfarisi et al., 2026). In addition, the study's use of institutional context (viz., Vision 2030 alignment) as a moderating variable adds an element of contextual theorizing, which enriches the digital transformation and sports management literatures.

Meaning Empirical The present study is one of the first to present an in-depth case study analysis of the impact of digital transformation on organizational performance in a Saudi motorsport organization. The study provides rich empirical evidence at the organizational level to supplement and extend the large-sample quantitative studies that dominate the extant

literature on digital transformation and performance (Civelek et al., 2023; Tripathi et al., 2024). The case study method also allows the exploration of causal mechanisms and contextual enabling conditions which cannot be captured by survey-based designs, an important methodological contribution given the complexity of digital transformation as an organizational phenomenon. The study also fills a major geographic gap in the digital transformation literature by focusing on the GCC regional context, thereby contributing to the field's understanding of how national institutional environments impact digital transformation outcomes. Practical importance. On the managerial and policy fronts, the study offers actionable evidence-based recommendations to the SMC leadership on how to optimize digital transformation strategies towards maximum performance impact. The significant and sustained investment by the Saudi government and the Public Investment Fund (PIF) in mega sporting events and digital sports infrastructure means that evidence-based guidance on the organisational conditions that increase returns on digital investment is of direct and immediate policy relevance (Oraby et al., 2025; Abudaqqa, 2025). The findings of the study could be transferable to similar high-technology sports enterprises in the GCC region and other emerging economies investing in digital transformation for competitive positioning and economic diversification, in addition to SMC.

1.7. Scope and Limitations

Scope:Geographically, this study is limited to the Kingdom of Saudi Arabia. Organizationally, this study is limited to the Saudi Motorsport Company (SMC) as the main unit of analysis. The study covers the period 2020-2025, which coincides with the accelerated phase of investment in digital transformation in line with the mid-term milestones of Vision 2030. This phase includes the most recent and strategically important phase of the digital development of SMC, including the company's participation in landmark international motorsport events. The digital transformation is studied in terms of its multi-dimensional constructs, such as strategic, technological, operational, and cultural. Organizational performance is measured in terms of operational, financial, and competitive dimensions based on the established frameworks in the digital transformation literature (Cosa et al., 2024; Chen, 2025). **Restrictions** There are several limitations to be aware of. First, findings may have limited generalizability as a single-organization case study to other sports organisations or industrial contexts. This is counterbalanced by the study's thick description, logic of theoretical replication and explicit discussion of conditions for transferability. Second, the

confidential nature of SMC's commercial arrangements may restrict access to financial performance data, necessitating the use of proxy indicators and qualitative assessments for financial performance dimensions. Third, the study design, which is based on cross-sectional data collection, does not enable longitudinal causal inference, that is, the change in performance due to digital transformation over time will be measured retrospectively through informant reports and not real-time. Fourth, social desirability bias in interview responses, a common limitation of qualitative research in organizational settings will be mitigated through triangulation across multiple data sources including documents, archival records and multiple informant perspectives.

1.8. Definition of Key Terms

As we go through this investigation, the following terms will be explained:

1. Digital transformation is the implementation of digital technologies like AI, cloud computing, big data analytics, IoT and automation across all aspects of an organization's work (Cosa et al., 2024; Dašić, 2023). "This project is about changing how we create value, how we deliver services and how we achieve our strategic objectives.
2. Organizational performance The success of an organization in terms of operations, profits and sales. This study operationalizes efficiency, productivity, process quality, financial performance (revenue growth, cost optimization, return on investment) and competitive performance (market positioning, innovation capability, stakeholder value creation).
3. Dynamic Capabilities Theory (DCT): DCT suggests that organizations can gain sustainable competitive advantage in a dynamic environment by developing higher-order capabilities to identify market opportunities, make strategic investments and reconfigure assets and competencies.
4. Resource Based View (RBV) Possession and use of organizational resources that are valuable, rare, inimitable and non-substitutable are the foundation of sustained competitive advantage. Theory developed by Resource Based View (RBV). The RBV maintains that digital technologies and capabilities are strategic resources. The process includes resources that can provide the organization with competitive advantages that are difficult to imitate in the digital transformation (Hsiao, 2024; Li, 2025).

5. Saudi Motorsport Company (SMC) Saudi Motorsport Company (SMC) is the largest public motorsport management, development and regulation organisation in Saudi. Saudi Motorcade Company (SMC) hosts international motorsport events, such as the Saudi Arabian Grand Prix, Formula E and the Dakar Rally, to help with Saudi Arabia's Vision 2030 sports and entertainment diversification objectives. This is also the Dakar rally.
6. Saudi Arabia's Strategic Reform Framework (Vision 2030) 2016. Its goal is to diversify the economy away from oil through investments in tourism, entertainment and sports, digital technology and human capital. Vision 2030 (Alnasser et al., 2024; Allathy, 2026) is driving SMC's digital transformation.
7. In order to meet its strategic objectives, the organization must be able to make full use of its resources. Capabilities are integrated routines and processes, human skills and knowledge that count. Organizational capabilities mediate the effects of digital resource acquisition and performance on DCT capacity building (Moektiwibowo et al., 2025; Abed Alhameed, 2026)..

1.9. Structure of the Thesis

The thesis is structured into five chapters, each performing a specific role in addressing the research problem and achieving the study objectives. The following summary describes the content and logical contribution of each chapter:

1. Chapter One: Introduction presents the background, rationale, and structure of the study. It introduces the research problem, states the problem statement, formulates the research objectives and questions, presents the study hypotheses, defines the scope and limitations, explains key terms, and outlines the structure of the thesis. Together, these elements provide the conceptual foundation for the subsequent chapters.

2. Chapter Two: Literature Review provides a comprehensive critical review of the theoretical and empirical literature underpinning the study. It examines the Resource-Based View and Dynamic Capabilities Theory as complementary theoretical frameworks, reviews literature on digital transformation and organizational performance, positions the study within the Saudi Arabian and GCC digital transformation context, examines digital

transformation in global sports management, and identifies the specific research gaps addressed by this study.

3. Chapter Three: Research Methodology describes the philosophical, methodological, and procedural framework of the study. It defines the research philosophy, justifies the mixed-methods single case study design, describes the data collection instruments, specifies the sampling strategy and participant profile, discusses validity, reliability, and research ethics, and outlines the analytical procedures for qualitative and quantitative data.

4. Chapter Four: Results and Findings presents and discusses the empirical evidence produced by the study. It reports the qualitative thematic analysis of interview and documentary data, presents the quantitative questionnaire results, tests the five research hypotheses, and discusses the findings in relation to the theoretical framework and existing empirical literature. This chapter also identifies points of convergence and divergence with previous scholarship and provides new theoretical and practical insights.

5. Chapter Five: Conclusions and Recommendations synthesizes the study's findings and contributions. It summarizes the main findings in relation to the research questions and hypotheses, discusses the theoretical and empirical contributions to digital transformation and sports management literature, offers practical recommendations for SMC and Saudi sports governance authorities, acknowledges the study's limitations, and proposes directions for future research.

The thesis presents a logical flow of contextual grounding (Chapter 1), theoretical and empirical review (Chapter 2), methodological design (Chapter 3), evidence generation (Chapter 4), and synthesis and application (Chapter 5), which is a systematic and rigorous approach to addressing the research problem and advancing knowledge in the field.

Table 1.1: Overview of Thesis Structure and Chapter Focus

Chapter	Title	Key Focus
Chapter 1	Introduction	Background, problem statement, objectives, questions, hypotheses, scope, definitions, and thesis structure
Chapter 2	Literature Review	Theoretical frameworks (RBV & DCT), digital transformation concepts, organizational performance dimensions, Saudi & sports contexts
Chapter 3	Research Methodology	Research philosophy, design, approach, data collection methods, sample, instruments, validity, reliability, and ethical considerations
Chapter 4	Results and Findings	Data presentation, thematic analysis, hypothesis testing, and discussion of findings in relation to existing literature
Chapter 5	Conclusions	Summary of findings, theoretical and practical contributions, limitations, recommendations, and future research directions

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction to the Chapter

In this chapter the theoretical and empirical literature on which this study is based is critically reviewed. It varies from basic theoretical frameworks, to empirical evidence, to a final synthesis of research gaps. The review is bounded to 2020-2026, but focuses on the most current scholarship, while maintaining seminal theoretical anchors. Six thematic domains are covered: theoretical grounds (Section 2.2), concepts and dimensions of digital transformation (Section 2.3), digital transformation and organisational performance (Section 2.4), the Saudi Arabian context (Section 2.5), the sports industry (Section 2.6), and research gaps and the conceptual framework (Section 2.7). The sources were obtained from Scopus, Web of Science, Consensus and Google Scholar with the keywords ‘digital transformation’, ‘organizational performance’, ‘dynamic capabilities’, ‘Vision 2030’, ‘sports management’ and ‘motorsport’.

2.2 Theoretical Foundations

2.2.1 The Resource-Based View (RBV)

The Resource-Based View (RBV) is formalized by Barney (1991) building on the seminal work of Penrose (1959). This perspective suggests that a sustained competitive advantage may be attained by the employment of internal resources that are valuable, rare, inimitable and non-substitutable. In the domain of research on digital transformation, RBV treats digital technologies, data assets and AI infrastructure as strategic VRIN resources. This is the VRIN-model. The bundling of these resources in an organization results in performance advantages that are difficult for competitors to imitate (Hsiao, 2024; Wagh & Shete, 2026). VRIN resources are confirmed to be strong predictors of competitive advantage in digital contexts in a systematic review by Mailani et al. (2024). The authors found that companies utilizing RBV for data analytics and cloud infrastructure enjoyed significantly higher profitability with their findings. Hsiao (2024) differentiates between the possession of digital resources and the organizational capacity to combine them, based on RBV. “It’s the level of integration that’s most telling in determining performance returns, not the size of the acquisition,” he says. In this investigation, the VRIN assets are operationalized as the SMC owned Oracle digital resources. The degree to which these assets work well is proportional to the degree to which they’re baked into engineering workflow and organizational strategy.

2.2.2 Dynamic Capabilities Theory (DCT)

The RBV does not take into account how organizations replace their existing resource base in the face of environmental upheaval. The Dynamic Capabilities Theory (DCT) of Teece (Teece et al., 1997; Teece, 2007) deals with this problem. DCT has three meta-capabilities in addition to sensing (the process of recognizing digital opportunities), seizing (the process of mobilizing resources to capture them) and reconfiguring. Ellstrom et al. (2021) have suggested six organizational routines that can be empirically applied to the DCT model. These routines include cross-industry digital sensing, digital strategy development and development of unified infrastructure that can be implemented. Froehlich et al (2024) say that sensing, seizing and reconfiguring processes can be used to reframe strategies, combine new routines, motivate human resource investment, and oversee cultural change. Martins (2022) based on the survey of 400 managers of small and medium-sized enterprises (SME) shows that the three dimensions of DCT have positive and independent effects on firm performance. Digitalization also moderates the transforming-performance link, thus providing evidence for Hypothesis H4.

2.2.3 Integrating RBV and DCT

An integrated stock-flow framework (Sun et al. 2024) utilizes VRIN resource stocks to differentiate and dynamic capability flows to restore the resources during competitive turbulence. It would be better to do them together, than separately. Especially in digital environments where the quality and speed of resource renewal determines performance. For SMEs, Civelek et al. (2023) found that dynamic capabilities fully mediate the relationship between VRIN resources and DT success. Digital Human Capital is a VRIN resource that enables integration; dynamic capabilities increase resource ownership and performance (Isnawati et al., 2026). This study uses RBV-DCT. H1-H5 examines the VRIN resources, capability mechanisms of sensing, seizing, and reconfiguring processes, and operational, financial, and competitive performance constructs of SMC's Oracle digital investments.

2.2.4 Conceptual Framework

The conceptual framework of the study was adapted from RBV-DCT as presented in Figure 2.1. The independent variable will be the four-dimensional digital transformation. Moderating role of transformational capabilities in the alignment to Vision 2030. The dependent variable is three dimensional organizational performance.

Table 2.1: Integrated Conceptual Framework — Digital Transformation, Dynamic Capabilities, Vision 2030, and Organizational Performance at SMC

INDEPENDENT VARIABLE	DEPENDENT VARIABLE
Digital Transformation at SMC ————— • Strategic (Vision 2030 alignment) • Technological (AI, IoT, Cloud, Oracle) • Operational (Events, Broadcasting, Ticketing) • Cultural (Data-driven culture, digital literacy)	Organizational Performance ————— • Operational Performance (efficiency, productivity) • Financial Performance (revenue, ROI, cost reduction) • Competitive Performance (market position, innovation)
MEDIATING VARIABLE	MODERATING VARIABLE
Dynamic Capabilities (DCT) ————— • Sensing: market + technology opportunity scanning • Seizing: strategic digital investment decisions • Reconfiguring: restructuring assets and processes	Vision 2030 Strategic Alignment ————— • Government institutional support • PIF investment enablement • National DT legitimacy • Infrastructure access
THEORETICAL ANCHOR (RBV)	HYPOTHESES
VRIN Digital Resources at SMC: • Valuable → AI systems, Oracle data platforms • Rare → proprietary motorsport data/analytics • Inimitable → embedded operational routines • Non-substitutable → integrated DT architecture	H1: DT → Operational Performance (+) H2: DT → Financial Performance (+) H3: DT → Competitive Performance (+) H4: Dynamic Capabilities mediate DT → Performance H5: Vision 2030 alignment moderates DT → Performance

Table 2.2: Comparative Analysis of RBV and DCT in the Digital Transformation Context

Dimension	Resource-Based View (RBV)	Dynamic Capabilities Theory (DCT)	Integration in This Study
Core Logic	Competitive advantage from VRIN resource possession	Advantage from capabilities to renew resources	VRIN digital assets + sensing/seizing/reconfiguring → performance
Unit of Analysis	Resource stocks (data, IT, talent)	Capability flows (sensing, seizing, transforming)	Both: Oracle resources + capability routines at SMC
Time Orientation	Static / cross-sectional	Dynamic / longitudinal process	Multi-period case study capturing states and flows
Performance Link	Resources → performance (direct)	Capabilities → renewal → performance (indirect)	Tests H1–H3 (direct) and H4 (mediated)
Key Theorists	Barney (1991); Penrose (1959)	Teece et al. (1997); Teece (2007)	Integrated: Hsiao (2024); Sun et al. (2024)

2.3 Digital Transformation: Concepts, Dimensions, and Drivers

2.3.1 Defining Digital Transformation

The term digital transformation (DT) is widely used in academic and practitioner literature but it is not defined. Nadkarni and Prügl (2020) reviewing 58 studies find that digitization, digitalization and digital transformation are frequently conflated. Digitization is the conversion of analog information into digital formats, digitalization is the use of digital tools to enhance processes and digital transformation is the fundamental rethinking of value creation, business models and competitive strategy throughout the organization through holistic digital integration. Reis et al. (2023) conducted a meta-review of 296 articles and defined DT as a multi-level, non-linear concept with six dimensions, namely organizational, technological, social, economic, sustainability, and smart city contexts. This research characterizes SMC's digital transformation as the strategic, integrated deployment of Oracle enterprise systems, AI, data analytics, cloud computing and fan engagement platforms throughout all SMC Engineering Department practices to radically change workflows, performance and competitive positioning in accordance with Vision 2030. Vision 2030 competitive positioning.

Table 2.3: Comparative Analysis of Digital Transformation Definitions (2020–2026)

Author(s) & Year	Definition (Summary)	Level	Key Focus
Hanelt et al. (2020)	Continuous process moving firms toward malleable designs enabling adaptation in digital ecosystems	Org / Ecosystem	Org change, ecosystem co-evolution
Reis et al. (2023)	Multi-dimensional process: organizational, technological, social, and sustainability dimensions	Org / Societal	Six-dimension taxonomy
Omol (2023)	Radical strategic evolution of strategy, structure, process, culture, and leadership via digital technology	Organizational	Leadership, culture, ethics
Furr et al. (2022)	Strategic executive choice addressing product/platform, firm/ecosystem, and people/tool tensions	Strategic	Global strategy, ecosystem tensions
Dąbrowska et al. (2022)	Socioeconomic change across individuals, organizations, ecosystems, and societies via digital adoption	Multi-level	Geopolitics, ecosystems

2.3.2 Key Dimensions of Digital Transformation

This study operationalizes the DT in four dimensions suggested by Hanelt et al. (2020), Omol (2023), Cyfert (2025), and Michelotto (2024). This is what the researchers mentioned above demonstrate. The Strategic Dimension reflects the commitment of the board to digital technology and Vision 2030. Technology is things like Oracle Enterprise Resource Planning (ERP), analytics, cloud computing, the Internet of Things and artificial intelligence. The Operational Dimension is a measure of the level of use of digital tools in engineering workflows (facility requests, procurement, event coordination, etc.). The Cultural Dimension covers topics like data-driven culture, digital leadership, and workforce digital fluency. As indicated by Cyfert et al. (2025), the success of DT is less driven by the implementation of technology and more driven by culture and leadership. The finding is discussed in relation to the possible influence it may have on the organizational change that SMC is currently undergoing.

Table 2.4: Digital Transformation Dimensional Frameworks Across Key Studies

Author(s)	Strategic	Technological	Operational	Cultural / Leadership
Hanelt et al. (2020)	✓ Ecosystem strategy	✓ Digital technologies	✓ Process redesign	✓ Organizational design
Omol (2023)	✓ Strategy	✓ Technology enablers	✓ Processes	✓ Culture & leadership
Cyfert et al. (2025)	✓ Digital strategy	✓ IT infrastructure	✓ Digital competencies	✓ Digital culture
Michelotto et al. (2024)	✓ Management capability	✓ Tech resources	✓ Business processes	✓ Human capability

2.3.3 Drivers, Barriers, and Maturity Models

DT advocates competition, government incentives, enhanced customer experience, and lower operating expenses (Omowole et al., 2024). Vision 2030 is the Saudi Arabian government's formalization of its digital mandate. We know the problems. According to Jones et al. (2021), the most important problems are cultural resistance, legacy technology constraints, skills gaps, and uncertainty regarding return on investment. Saudi Arabia faces a number of unique

challenges, some of which are identified by Allathy et al. (2026). These challenges include resistance to institutional change, cybersecurity threats, complexity in data governance, and differences in infrastructure readiness. Mohammadi et al. (2023) classified the members of the sports business industry into digital beginners, followers, conservatives and leaders. “Governance, resilience, capacity. That’s step one, two and three. The most comprehensive holistic maturity model (Aras et al. 2023) covers the entire spectrum from data governance to strategy. For the purpose of evaluating digital maturity, the SMC Engineering Department makes use of these frameworks.

2.4 Digital Transformation and Organizational Performance

2.4.1 Conceptualizing Organizational Performance

Since the rise of the digital age, the performance of organizations has become difficult in a number of different ways. Cosa et al. (2024) reviewed 47 studies that show the discipline shifting from static financial metrics to dynamic actual frameworks, enabling agility, resilience, and engagement of stakeholders. “This has been a total reversal. However, Chen (2025) proposed a 6-dimensional sports enterprise governance performance index. The index is based on operational efficiency, financial performance, innovation, management efficiency, market adaptability and sustainable development. According to the H1-H3 hypotheses of the study and the empirical literature to be discussed below, the study uses a tripartite operationalization, differentiating operational, financial and competitive performance.

2.4.2 Digital Transformation and Operational Performance

One of the strongest relationships that has been found in the body of research that has been done in the past is the relationship between DT and operational performance. Guo et al. (2021) found a positive linear relationship between the level of the digital transformation and operational performance in their study of 2,254 Chinese manufacturing companies. From the results, it can be inferred that the impact of digital transformation on the operational performance is more lasting than the impact on the financial performance. As mentioned by Chen (2025), the use of DT in the sports industry leads to a 50% decrease in the time taken by the market to respond to demand. The findings also indicate that the 21 sports organizations that implement analytics platforms and management information systems are the most successful in using DT tools to enhance operational efficiency (Qi et al., 2024). This

is because they have a better capacity to manage their operations. This also has a direct impact on the engineering workflows at SMC driven by Oracle. The effects of this are very real, and important.

2.4.3 Digital Transformation and Financial Performance

The relationship between DT and financial performance is positive, but also complicated. Guo et al. (2021) discover that the relationship is U-shaped, meaning that DT investment has a negative impact on financial performance in the short term, but a positive impact on financial performance in the long term as the digital capabilities develop. Chen et al. (2024) examine a sample of 11,814 firm-year observations and find that the financial benefits of DT activities are most pronounced one year after implementation. Yavuz et al. (2025) develop the Return of Digitalization (ROD) ratio and show that the businesses with high ROD ratio are more profitable and have a higher brand value. This delay suggests that the company's financial performance returns are still in the accumulation phase, at least for the motorsport companies that have implemented Oracle HR services and procurement/finance.

2.4.4 Digital Transformation and Competitive Performance

Digital transformation has been shown to deliver competitive performance gains to many industries. The improvement is in market positioning, innovation capacity and strategic agility. Companies that applied RBV principles to manage their portfolio of digital resources have exhibited better competitive performance in the post-COVID crisis (Wagh and Shete, 2026). Digital transformation is not a technological innovation, but a strategic need for sports organizations (Christodimitropoulou et al., 2025). The most crucial enabling conditions for competitive advantage were identified as digital media culture, governance and leadership. Glebova and Madsen (2024) demonstrate that the twin transformation framework of digitalization and sustainability can offer competitive advantages to sports events. They do it with more fan engagement and more environmental responsibility.

2.4.5 Mediating and Moderating Factors

Digital Transformation (DT) has been shown in studies to improve organizational performance. The proposed relationship is complex. Success is more often related to other organizational issues. Shen et al. (2025) conducted a meta-analysis of 69 studies and found that digital transformation positively affects organizational performance through product and process innovation. Hanum et al. (2026) The performance of the public sector and the dynamic capabilities of organizational agility. Customer experience and digital transformation were found to be good predictors of motor sport company performance . (Masoud et al., 2023). The culture affects digital transformation and organizational performance (Shen et al. 2020). The paper emphasizes the relevance of an organizational context for the digital transformation assessment in motorsport.

Table 2.4: Comparative Analysis of Empirical Studies on Digital Transformation and Organizational Performance

Study	Method	Dimension	Key Finding	Context
Guo et al. (2021)	Panel data, 2,254 firms	Operational + Financial	Positive linear DT→Operational; U-shaped DT→Financial	China manufacturing
Masoud et al. (2023)	SEM, 164 Saudi firms	Firm performance	DT mediated by customer experience + IT innovation	Saudi services
Chen et al. (2024)	11,814 firm-year obs.	Financial	DT reduces costs, improves profitability; ~1yr time lag	China listed firms
Cosa et al. (2024)	SLR, 47 studies	Performance systems	DT fosters agility, real-time metrics, resilience	Cross-industry global
Ahmed et al. (2022)	Survey, Saudi sports	Productive + competitive	Positive DT↔performance correlation; digital maturity gap	Saudi sports facilities
Chen (2025)	Sports enterprise case	Operational + innovation	50% reduction in market response time post-DT	Sports enterprises

Table 2.5: Comparative Analysis of Dynamic Capabilities Studies in Digital Transformation Research

Study	Method	DCT Operationalization	Key Findings
Ellström et al. (2021)	Qualitative interviews	6 routines: sensing, seizing, reconfiguring	DCT routines prerequisite for DT success; cross-industrial sensing most critical
Froehlich et al. (2024)	Qualitative case study	Sensing, seizing, reconfiguring → strategy, HR, culture	Dynamic capabilities configure DT through integrated business strategies
Martins (2022)	Quantitative, 400 SMEs	Sensing, seizing, transforming scales (validated)	All 3 DCT dimensions positively affect SME performance; digitalization moderates
Albannai et al. (2024)	Systematic review	Digital sensing, seizing, transforming in leadership context	Digital leadership → digital dynamic capabilities → DT outcomes
Abdurrahman et al. (2023)	SEM, 322 banking	Sensing (largest), seizing, transforming; GRC as moderator	DT mediates DC→banking performance; sensing has biggest effect

2.5 Digital Transformation in the Saudi Arabian Context

2.5.1 Vision 2030 and the National Digital Agenda

Since the launch of Saudi Vision 2030 in 2016, digital transformation has become a more and more important pillar in the Kingdom's efforts to overhaul its economy and reduce reliance on oil revenues. Alnasser et al. (2024) point out that the vision's digital transformation strategy comprises several domains, including greater use of artificial intelligence and e-commerce to foster business growth, the provision of digital government services, and the upgrading of people's skills to function effectively in the digital environment. The Saudi Digital Government Authority (SDGA) is supporting these initiatives through the provision of guidance and governance frameworks to assist organisations in systematically adopt digital solutions.

Also, the Public Investment Fund (PIF) considers digital transformation and good leadership as the key elements that can lead to successful transformation in its portfolio companies (Oraby et al., 2025). This is especially the case with the Motorsport Company, where digital transformation is bringing about increased operational efficiency, better decision-making, and a better fit with the wider goals of Vision 2030.

2.5.2 Empirical Evidence from Saudi Organizations

Masoud et al. (2023) present the evidence studies for Saudi and demonstrate that digital transformation has a positive and significant effect on firm performance in Saudi service sectors with customer experience (strongest effect) and IT innovation as mediators. This finding has a direct implication for H1–H3 of this study that management of fan and partner experience is the most powerful performance lever for the Motorsport Company. In addition, the positive influence of government support on the ROI of DT in Saudi SMEs, as reported by Tripathi et al. (2024), indirectly substantiates the proposition of H5 that the alignment of Vision 2030 moderates the DT–performance association at Motorsport

Company. Alasiri et al. (2022) find that leadership quality and IT alignment are the most important organizational enablers of DT in the Saudi private sector and that DT significantly improves organizational performance.

2.5.3 Barriers and Enablers in the Saudi Context

Saudi Arabia's institutional conditions are both enabling and constraining despite their apparent contradiction. The tailwinds of government mandate, public-private partnership investment, and national infrastructure programs do not lift organizations that operate in environments that are less institutionally supportive for their operations. According to Allathy et al. (2026), some of the obstacles that need to be overcome include the burdens associated with cybersecurity risk management, the gaps in human capital that exist in advanced digital competencies, and the cultural resistance to agile and data-driven working models. Issues with Oracle's usability, a lack of self-initiated training, and inconsistent adoption of the digital workflow across sub-departments within the Engineering Department that deal with technically complex event delivery operations are the obstacles that stand in the way of SMC.

Table 2.6: Comparative Analysis of Digital Transformation Studies in the Saudi Arabian Context

Study	Method & Sample	Key Variables	Findings & Gap This Study Addresses
Masoud et al. (2023)	SEM, 164 Saudi service firms	DT, customer experience, IT innovation, performance	CX mediates DT→performance; no sports sector; no case-level analysis
Tripathi et al. (2024)	Survey, Saudi SMEs	DT awareness, government support, performance	Govt support amplifies DT returns; SMEs only; no sports or org case depth
Alnasser et al. (2024)	Literature review	DT strategy, Vision 2030 alignment	Three DT imperatives identified; no primary data; no sports context
Allathy et al. (2026)	Literature review	DT barriers, Vision 2030, readiness	Structural barriers documented; no performance outcomes; no sports context

Alasiri et al. (2022)	Survey, Saudi private sector	Leadership, IT alignment, DT, performance	Leadership + IT alignment → DT → performance; no sports sector
This Study	Mixed-methods, N=19 census	DT dimensions, DCT, Vision 2030, performance	Fills all gaps: sports, motorsport, case-level, mechanism, V2030 moderation

2.6 Digital Transformation in the Sports Industry

2.6.1 Overview of Digital Transformation in Global Sports Management

Sports are being transformed around the world by big data, fan experience technology and global digital distribution. “DT in sports management represents a significant strategic paradigm shift that transforms organizational structures, athlete performance systems and commercial models (Christodimitropoulou et al. 2025). Sports DT is a continuous process of integrating technology, people and business processes to deliver value for organizations and audiences (Dašić, 2023). “Therefore, sports organizations need to assess their technological readiness, organisational capacity and transformation maturity before investing in digital technology” (Magaz-González et al. 2023).

2.6.2 Key Technologies Reshaping Sports Organizations

Within the scope of digital technologies, one of the most important technologies that the sports industry has to offer is machine learning. Xu et al. (2025) suggest the use of machine learning for talent scouting, game strategy, injury prevention and live interaction with fans. Other applications include injury prevention. Something like that is something that they should do. During the course of their discussion, Nalbant et al. (2022) cover a range of different applications of machine learning in the field of motorsport. Performance benchmarking, race strategy development and competitor intelligence gathering are among the applications. Data from social media, sensors in venues and ticketing data can be used to build rich fan profiles (Yiapanas, 2025). And this can be done through big data analytics. See the sources below for available information. Personalized marketing is one of the marketing strategies based on experiences. The options are: Song et al. (2025) found that fan engagement strategies based

on machine learning resulted in a 42.7% increase in fan engagement. This means that the value of the brand rose by 34.2% and the level of satisfaction experienced by fans grew by 38.5%. The technology that is known as digital twins, according to Glebova et al. (2023), has the capacity to create highly realistic replicas of a location. Because of this, the logistics are simplified and the experience that happens for the fans is improved. Technology developments mean there are now a lot more motorsport events that can be held in a lot more places and on a lot more dates.

2.6.3 Digital Transformation and Performance in Sports Organizations

The most relevant evidence for Saudi Arabia is provided in Ahmed et al. (2022) who report a statistically positive relationship between DT management and productive and competitive performance in Saudi sports facilities. Deficiencies in digital maturity are also well documented and common. This is the best evidence pertaining to Saudi Arabia. Sports businesses are leveraging DT to boost operational efficiency by 50% (Chen, 2025). According to Stegmann et al. (2021) digital platforms are changing the relationship between organization and fan. “And they’re going from one-way content delivery to interactive, personalized engagement. Furthermore, it is the outcome they arrive at after examining the co-creation of digital value in the domain of sport marketing. This will raise the commercial value of the brand and the loyalty of its clients. The results show that the Twin Transformation with digitalization and sustainability leads to competitive advantages in sports management not only through the use of new technologies. This is confirmed by the results of Glebova and Madsen (2024).

2.6.4 Digital Transformation in Saudi and GCC Sports Organizations

This study contributes to the lack of studies that examine digital transformation in GCC sports organizations. The most relevant empirical source still available is Ahmed et al. (2022) as it provides the correlation between DT and performance and the extent of deficiencies of maturity in sports facilities. A lot of the evidence that is currently available is grey literature and policy documents (Ahmed et al. 2022). Saudi Arabia has spent billions on various sports including Formula 1, Formula E and the Dakar Rally as part of its Vision 2030 plan. It has also widened its coverage of motor sports. Such investments give Motor sports the institutional mandate and commercial imperative to handle its DT with technical

sophistication and organizational deliberateness. Zhang et al. (2025) One study explores the digital tools that can measure the carbon emissions, improve logistics efficiency, and improve fan engagement for the Formula One ecosystem, with the formula that is best suited for the individual formulas. The study results suggest that the digital frontier of motorsport is organizationally challenging but technically advanced. most similar to theirs as a study on the digital tools used within the ecosystem of Formula One for fan engagement, logistics optimisation and carbon monitoring. Results of the study show that the digital frontier of motorsport is a technologically sophisticated and organizationally complex one.

Table 2.7: Comparative Analysis of Digital Transformation Studies in the Sports Industry

Study	Sport/Sector	Key Technologies	Performance Outcome	Limitation Filled by This Study
Christodimitropoulou et al. (2025)	Sports management	AI, big data, fan platforms	New management paradigm; agility; fan engagement	Conceptual only; no primary data
Ahmed et al. (2022)	Saudi sports facilities	DT management systems	Positive DT↔performance; digital maturity deficiency	Survey-level; no enterprise case depth
Chen (2025)	Sports enterprises	Governance KPIs, digital systems	50% response time reduction; better financial management	China context; no motorsport
Qi et al. (2024)	21 sports orgs	Analytics, wearables, MIS	Analytics + MIS highest-impact tools	No Saudi/GCC context; no case depth
Glebova et al. (2025)	Sports industry	AI, blockchain, fan analytics	AI reshapes competitive and commercial performance	Synthesis only; not motorsport specific

2.7 Research Gaps, Conceptual Framework, and Study Positioning

2.7.1 Summary of Identified Research Gaps

The thematic analysis of six domains of knowledge identifies five major research gaps which together represent the academic justification for the present research. Gap 1 (Geographic): DT-performance research is overwhelmingly concentrated in manufacturing and financial services sectors in East Asian countries; GCC, particularly in the sports industry, are grossly underrepresented. Gap 2 (Sectoral) Sports organizations (especially those engaged in the management of motorsport events) are not systematically considered in DT research despite their increasing strategic importance in the national economic development agendas. Gap 3 (Theoretical) The integrated theoretical lens of RBV and DCT in sports management DT research has not been previously developed or empirically tested, especially in GCC emerging economy contexts. Gap 4 (Methodological): The DT-performance literature is dominated by large sample survey designs and lacks mechanism-level case study evidence that can reveal the organizational processes and contextual enablers. Gap 5 (Institutional): Vision 2030 has been theoretically posited as a moderator of DT-performance at an organizational-level, but it has not been empirically tested within a sports enterprise case study.

Table 2.8: Comprehensive Research Gap Analysis — Evidence and Study Contributions

#	Gap	Literature Evidence	This Study's Contribution
G1	Geographic: DT-performance studies concentrated in East Asia; GCC sports absent	Guo et al. (2021) — China mfg; Masoud et al. (2023) — Saudi services only	First org-level case of DT-performance in Saudi motorsport under Vision 2030
G2	Sectoral: Sports organizations — especially motorsport — absent from DT research	Christodimitropoulou et al. (2025) — conceptual; Ahmed et al. (2022) — facility survey	In-depth SMC Engineering Dept. case study; first motorsport-specific DT analysis
G3	Theoretical: RBV and DCT rarely integrated in sports management DT research	Hsiao (2024) — general DT; Civelek et al. (2023) — SMEs only; no sports application	Explicit RBV-DCT integration operationalized at SMC; extends both frameworks
G4	Methodological: Survey designs dominate; mechanism-level case evidence scarce	Masoud et al. (2023) — survey; Tripathi et al. (2024) — survey; no organizational case studies	Mixed-methods census case study generates mechanism-level evidence (N=19)
G5	Institutional: Vision 2030 as DT-performance moderator not empirically tested at org level	Tripathi et al. (2024) — SME-level moderation only; no organizational case testing	H5 explicitly tests Vision 2030 alignment as moderator in DT-performance at SMC

2.7.2 The Study's Conceptual Framework

Figure 2.1 shows the conceptual framework organizing the analytical architecture of the study around four structural components. Digital transformation (independent variable) is operationalized in four dimensions: strategic, technological, operational and cultural . The organizational dynamic capabilities as the mediating variable are measured by sensing, seizing and reconfiguring, according to the six-routine model of Ellström et al. (2021). The Vision 2030 strategic alignment (moderating variable) is comprised of institutional enabling conditions, including government support, PIF investment, infrastructure access and national DT legitimacy. The dependent variable, organizational performance, is measured at operational (H1), financial (H2) and competitive (H3) levels. Dynamic capabilities mediate (H4) the relationship between DT and performance, and Vision 2030 alignment moderates (H5) this relationship.

2.7.3 Summary

The theoretical and empirical base for the study in five thematic areas was provided. Three important conclusions emerge. First, the integrated RBV DCT framework offers the most theoretically comprehensive and empirically supported perspective for investigating digital transformation performance in dynamic high-technology organizational contexts combining resource stock logic (RBV) and capability flow logic (DCT) to address both the existence and sustainability of competitive advantage. Secondly, the existing empirical literature on DT performance is substantial but is limited in geographical scope, sectoral coverage, theoretical perspective and methodological approach, thereby creating a clear scholarly space for this study's contribution. Third, the institutional context of the Saudi Vision 2030, with its national digital mandate, PIF investment support, and strategic portfolio for motorsports, offers an opportunity to study DT performance dynamics that are novel in an academic sense and consequential in a practical sense.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research methodology adopted to investigate the effect of digital transformation on the organizational performance of Saudi Motorsport Company (SMC). It explains the philosophical assumptions, research design, sampling strategy, data collection instruments, analytical procedures and quality assurance measures underpinning this study. All methodological decisions are grounded in peer-reviewed academic literature and are a direct match with the theoretical framework of the study – integrated Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) – and its five research hypotheses (H1–H5). This chapter is divided into eight sections, including research philosophy (3.2), research design and strategy (3.3), population and sampling (3.4), data collection methods (3.5), the research instrument, the Engineering Department Digital Transformation Questionnaire (EDTQ) (3.6), data analysis (3.7), validity and reliability (3.8), and ethical considerations (3.9), followed by a chapter summary and a methodological gap analysis (3.10).

3.2 Research Philosophy

The current study adopts the pragmatist philosophical position which rejects the dichotomous choice of positivism and interpretivism, and accepts both as valid and complementary strategies of knowledge-generation (Dawadi et al., 2021; Alfakhry et al., 2026). Epistemologically, pragmatism is founded on the principle that research methods should be selected on the basis of what best answers the research question – not on paradigmatic allegiance (Lim, 2023; Simpson et al., 2021). This study recognizes the co-existence of two ontological dimensions of reality: the objective organizational performance outcomes of SMC's digital transformation (measured through structured survey data) and the socially constructed meanings, experiences and capability-building narratives of Engineering Department staff (only accessible through qualitative inquiry). The pragmatist paradigm allows for both dimensions within a single mixed-methods design (Dawadi et al., 2021; Shrestha et al., 2024).

3.3 Research Design

This study adopts a Mixed-Methods Exploratory Single Case Study design, which combines both quantitative (Likert-scale questionnaire) and qualitative (semi-structured interviews and open-ended questions) data collection and analysis methods within a single bounded organizational case – SMC's Engineering Department. Gamage (2025) also backs up the

notion that convergent parallel mixed methods designs are most appropriate for research questions that cannot be fully addressed using a single method. The quantitative strand tests H1–H5 statistically, whereas the qualitative strand explores the organizational mechanisms, capability building processes and contextual factors through which digital transformation produces performance outcomes, processes that survey data alone cannot reveal (Froehlich et al., 2024). The single case study strategy is justified by the purposive selection strategy of Yin (2018). The Engineering Department of SMC fulfills all three requirements of a revelatory single case: it is representative (its DT experience is representative of the broader organizational challenge at SMC), critical (its digital performance is key to SMC's organizational performance as it is the main operational unit responsible for event delivery), and revelatory (no other case study has examined DT in a Saudi motorsport engineering department). The embedded design consists of three sub-units, Facility Management, Design and Technical Operations, embedded analytical units within the single case, allowing comparison within departments (Yin, 2018; Corrêa et al., 2025).

Table 3.1: Research Design Summary — Elements, Decisions, and Academic Justifications

Design Element	Decision	Justification
Research Paradigm	Pragmatism	Integrates quantitative + qualitative; Dawadi et al. (2021)
Research Strategy	Single Embedded Case Study	SMC Engineering Dept. as critical revelatory case; Yin (2018)
Population & Sampling	Total Census — N=19 (all engineering staff)	Eliminates sampling error; Saunders et al. (2019); Farooq (2012)
Unit of Analysis	Engineering Dept. (Facility / Design / Technical Ops)	Purposive selection — digital catalyst of SMC; Yin (2018)
Quantitative Instrument	EDTQ — 55 Likert items, 5-point scale	TAM; IS Success Model; RBV-DCT scales; Jo et al. (2023)
Qualitative Instrument	Semi-structured interviews + open-ended questions	High information power; Malterud et al. (2016)
Quantitative Analysis	Descriptive stats + Cronbach's alpha + Pearson correlation (SPSS v28)	Malapane et al. (2024)
Qualitative Analysis	Reflexive thematic analysis — 6 phases	Braun & Clarke (2021); Naeem et al. (2023)

Integration	Pillar	Integration	Process	—	Hall et al. (2023); Hands (2022)
Validity & Reliability		Triangulation + member-checking + Cronbach's $\alpha \geq 0.70$			Corrêa et al. (2025); Schlunegger et al. (2024)

3.4 Population and Sampling Strategy

3.4.1 Study Population

The study population is all N=19 employees of SMC's Engineering Department which consists of three sub-departments, namely Facility Management, Design and Technical Operations. These 19 employees constitute the total, countable and fully accessible population relevant to this investigation, i.e., the organizational actors who have direct, daily experience of SMC's Oracle-enabled digital transformation and its effects on engineering workflows and performance.

3.4.2 Census Approach — Rejection of Probability Sampling Formulas

The study uses a total census approach, surveying all N=19 engineering employees, not a sample. Three convergent grounds explicitly reject standard probability sampling formulas including Cochran's (1977) and Yamane's (1967) simplified formulas. Both formulas are designed for much larger populations and, when applied to N=19, result in minimum sample sizes close to the whole population, rendering the concept of sampling mathematically redundant (Turner, 2020). Second, a census does not have any sampling error at all – a methodological advantage supported by Saunders et al. (2019) and Farooq (2012) who advocate census designs where populations are small and fully accessible. Third, Hossan et al. (2023) explicitly state that census approaches maximise representativeness in small organisational populations, capturing the experience of all employees without a selection bias distortion. The census approach is further justified through Yin's (2018) purposive/judgmental selection logic: the Engineering Department is deliberately selected – not because it is a statistical representative of all 190 SMC employees, but because it constitutes the most theoretically relevant and information-rich organisational unit for answering this study's research questions. The justification for this is found in the concept of information power by Malterud et al. (2016): a narrow and specific study aim, a homogeneous expert sample (19 engineering professionals with direct Oracle experience), an established theoretical framework (RBV-DCT) and a planned strategy of quality

qualitative dialogue gives N=19 enough information power to reach thematic saturation and analytically meaningful quantitative analysis. Targeted, expert, theory-guided samples achieve qualitative saturation at sample sizes well below 20 (Roberts et al., 2026; Subedi, 2021).

3.5 Data Collection Methods

3.5.1 Quantitative — EDTQ Questionnaire

The main sector for collecting quantitative data is the Engineering Department Digital Transformation Questionnaire (EDTQ), a custom designed structured questionnaire with 65 questions. The questionnaire is made up of a total of 55 scale items and 10 demographic items. These items are grouped into seven different themes. All Likert items are coded with a 5-point response format based on validated ERP and IS adoption research instruments (Davis, 1989; Jo et al., 2023; Sternad Zabukovšek et al., 2022). 1 5 Strongly disagree Strongly agree . Reverse coding of items like Q8, Q23, Q31, Q47 and Q54 is carried out for the purpose of identifying and controlling for acquiescence bias. They will be mathematically recoded (six minus the response) to make them suitable for analysis in SPSS. The complete EDTQ for Malapane et al. 2024 is given in Section 3.6 below.

3.5.2 Qualitative — Semi-Structured Interviews and Open-Ended Questions

Qualitative data are gathered through 2 competing mechanisms. First, open-ended questions integrated in the EDTQ tool encourage respondents to elaborate on their experience with the Oracle system, identify barriers and enablers, and reflect on the Engineering Department's digital capability development generating high information power narratives from all 19 participants (Malterud et al., 2016; Oranga et al., 2023). Second, a purposively selected sub-sample of 6-8 participants representing various sub-departments and levels of seniority will be interviewed semi-structured for 40-55 minutes to allow a more in-depth investigation of DCT mechanisms (sensing, seizing, reconfiguring) and Vision 2030 alignment effects. Interviews will be audio-recorded with participant consent, accurately transcribed and member-checked for accuracy (Braun & Clarke, 2021).

3.5.3 Document Analysis

Additional documentary evidence including Oracle implementation plans, workshop materials, SMC annual reports (2021–2024), internal KPI dashboards and Vision 2030

alignment documentation will be systematically reviewed using content analysis. The third triangulation source in this study's multi-source design is the document analysis that can generate the longitudinal performance evidence and functional context that survey or interview data cannot generate (Im et al., 2023; Schlunegger et al., 2024).

3.6 Research Instrument: The EDTQ Questionnaire

The EDTQ is divided into 8 sections. Section 1 collects demographic data (D1-D10). Sections 2–8 present seven theoretical constructs measured by 55 Likert-type items, each based on validated scales from the Technology Acceptance Model (TAM), the IS Success Model, and the RBV-DCT framework. The complete questionnaire is provided below.

SCALE: 1 = Strongly Disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly Agree

SECTION 1 — DEMOGRAPHIC INFORMATION

Table 3.2: Section 1 — Demographic Items (D1–D10)

Code	Demographic Item	Response Options	Academic Basis
D1	Gender	Male / Female / Prefer not to say	Saunders et al. (2019)
D2	Age Group	Under 25 / 25–34 / 35–44 / 45–54 / 55+	Turner (2020)
D3	Nationality	Saudi / Non-Saudi (specify): _____	Alnasser et al. (2024)
D4	Years of Experience at SMC	<1 yr / 1–3 yrs / 3–5 yrs / 5–10 yrs / >10 yrs	Saunders et al. (2019)
D5	Highest Level of Education	Secondary School / Diploma / Bachelor's / Master's / PhD / Other	Malterud et al. (2016)
D6	Engineering Sub-Department	Facility Management / Design / Technical Operations	Yin (2018)
D7	Job Level	Officer/Engineer / Senior Engineer / Manager / Director	Froehlich et al. (2024)
D8	Oracle Module(s) Used	HR Services (2023) / Procurement–Finance (2024) / Both / Neither	Jo et al. (2023)
D9	Attended Oracle Training Workshops	All sessions / Some sessions / None–self-trained / No training	Hancerliogullari et al. (2021)

D10	Primary Workflow Before Oracle	Email only / Personal contact only / Both / Another system	Ramdhan et al. (2025)
-----	--------------------------------	--	-----------------------

Table 3.3: EDTQ Sections 2–8 — Full Questionnaire (Q1–Q55)

No.	Question / Statement	Scale 1–5	Construct & Justification
SECTION 2 — DIGITAL TOOL ADOPTION			
Hypothesis: Foundation for H1–H5 TAM — Davis (1989); Rahman et al. (2024)			
Q1	I actively use digital tools (Oracle, software platforms) in my daily engineering work at SMC.	○1 ○2 ○3 ○4 ○5	Active Use — TAM; Davis (1989)
Q2	Digital tools have replaced most of my previous email-based or paper-based engineering workflows.	○1 ○2 ○3 ○4 ○5	Adoption Depth; Cosa et al. (2024)
Q3	I received adequate training and support to adopt digital tools effectively in my engineering role.	○1 ○2 ○3 ○4 ○5	Training Adequacy; Hancerliogullari et al. (2021)
Q4	My Engineering sub-department has a clear and standardized digital workflow that all team members follow.	○1 ○2 ○3 ○4 ○5	Workflow Standardization; Ramdhan et al. (2025)
Q5	The digital tools used in our department are appropriate for the technical complexity of SMC's operations.	○1 ○2 ○3 ○4 ○5	Tool–Task Fit; TAM – Cheng (2020)
Q6	I feel confident using digital tools to complete my engineering responsibilities without significant assistance.	○1 ○2 ○3 ○4 ○5	Digital Self-Efficacy; TAM – Davis (1989)
Q7	The pace of digital tool adoption in the Engineering Department has been manageable and well-supported.	○1 ○2 ○3 ○4 ○5	Adoption Experience; Kallmuenzer et al. (2024)
Q8	★ ★ The introduction of digital tools has created more problems than it has solved in my engineering work.	○1 ○2 ○3 ○4 ○5	Adoption Resistance (REVERSE); Jones et al. (2021)
SECTION 3 — ORACLE SYSTEM EFFECTIVENESS			
Hypothesis: H1 — Digital Transformation → Operational Performance			
Q9	The Oracle system enables me to complete engineering-related requests faster than the previous email/meeting-based process.	○1 ○2 ○3 ○4 ○5	System Speed; IS Success Model; Jo et al. (2023)
Q10	The Oracle system provides accurate and up-to-date information needed for my engineering decision-making.	○1 ○2 ○3 ○4 ○5	Information Quality; DeLone & McLean (2003)

Q11	Using Oracle, I can track the real-time status of engineering requests without manual follow-up.	○1 ○3 ○5	○2 ○4	Process Transparency; Jo et al. (2023)
Q12	The Oracle system has reduced errors and miscommunications in engineering procurement and facility requests.	○1 ○3 ○5	○2 ○4	Error Reduction; IS Success Model; Cosa et al. (2024)
Q13	Oracle has improved the quality and reliability of service delivery within the Engineering Department.	○1 ○3 ○5	○2 ○4	Service Quality; IS Success Model; Rahman et al. (2024)
Q14	Oracle has reduced the number of meetings and manual communications required to manage engineering workflows.	○1 ○3 ○5	○2 ○4	Communication Efficiency; Ramdhan et al. (2025)
Q15	The Oracle system supports effective coordination between Engineering and other SMC departments (Finance, Procurement, HR).	○1 ○3 ○5	○2 ○4	Cross-Dept. Coordination; Jo et al. (2023)
Q16	Overall, the Oracle system is effective for managing the Engineering Department's core operational needs.	○1 ○3 ○5	○2 ○4	Overall Effectiveness; DeLone & McLean (2003)

SECTION 4 — EASE OF USE & SYSTEM CLARITY

Hypothesis: H1 — Perceived Ease of Use | TAM-PEOU — Davis (1989)

Q17	The Oracle system is easy to navigate when completing engineering-related tasks.	○1 ○3 ○5	○2 ○4	Navigation Ease; TAM-PEOU; Davis (1989)
Q18	The SMC Oracle training workshops adequately prepared me to use the system for my engineering workflows.	○1 ○3 ○5	○2 ○4	Training Effectiveness; Hancerliogullari et al. (2021)
Q19	The Oracle system interface presents information in a clear and logical format suitable for engineering operations.	○1 ○3 ○5	○2 ○4	Interface Clarity; Sternad Zabukovšek et al. (2022)
Q20	I can complete most Oracle tasks independently without needing help from IT support or colleagues.	○1 ○3 ○5	○2 ○4	User Independence; TAM – Davis (1989)
Q21	The Oracle system provides clear confirmation and feedback when I submit engineering requests.	○1 ○3 ○5	○2 ○4	Feedback Clarity; IS Success Model
Q22	Error messages in Oracle clearly explain what went wrong and how to correct it.	○1 ○3 ○5	○2 ○4	Error Guidance; Sternad Zabukovšek et al. (2022)

Q23	★ ★ The Oracle system is too complicated for the type of engineering work I do at SMC.	○1 ○2 ○3 ○4 ○5	Complexity Barrier (REVERSE); TAM; Cheng (2020)
Q24	Overall, the Oracle system is easy and clear enough for daily use in engineering operations.	○1 ○2 ○3 ○4 ○5	Overall Ease & Clarity; TAM; Davis (1989)
SECTION 5 — OPERATIONAL PERFORMANCE IMPACT			
Hypothesis: H1 — Digital Transformation → Operational Performance			
Q25	Digital transformation (including Oracle) has improved the overall productivity of the Engineering Department at SMC.	○1 ○2 ○3 ○4 ○5	Operational Productivity; H1; Guo et al. (2021)
Q26	The speed of completing engineering tasks has increased since Oracle was introduced.	○1 ○2 ○3 ○4 ○5	Process Speed; H1; Chen (2025)
Q27	The quality of engineering work outputs has improved due to the adoption of digital tools at SMC.	○1 ○2 ○3 ○4 ○5	Work Quality; H1; Cosa et al. (2024)
Q28	Digital tools have improved the Engineering Department's ability to plan and schedule tasks more effectively.	○1 ○2 ○3 ○4 ○5	Planning Efficiency; H1; Rahman et al. (2024)
Q29	The Engineering Department responds faster to urgent facility or technical issues since adopting digital systems.	○1 ○2 ○3 ○4 ○5	Operational Responsiveness; H1; Chen (2025)
Q30	Digital transformation has reduced wasted time caused by manual and paper-based processes.	○1 ○2 ○3 ○4 ○5	Waste Reduction; H1; Ramdhan et al. (2025)
Q31	★ ★ The operational performance of the Engineering Department would be the same with or without digital tools.	○1 ○2 ○3 ○4 ○5	DT–Performance Skepticism (REVERSE); Teng et al. (2022)
Q32	Overall, digital transformation has had a positive impact on the Engineering Department's operational performance at SMC.	○1 ○2 ○3 ○4 ○5	Overall Operational Performance; H1; Guo et al. (2021)
SECTION 6 — FINANCIAL & COMPETITIVE PERFORMANCE			
Hypothesis: H2 — DT → Financial Performance H3 — DT → Competitive Performance			
Q33	Digital tools have helped the Engineering Department reduce costs in facility management, procurement, or technical operations.	○1 ○2 ○3 ○4 ○5	Cost Efficiency; H2; Teng et al. (2022)

Q34	Using Oracle for procurement has improved the Engineering Department's ability to control budgets and monitor spending.	○1 ○2 ○3 ○4 ○5	Budget Control; H2; DeLone & McLean (2003)
Q35	Digital transformation has reduced the Engineering Department's reliance on costly manual labour and paper-based processes.	○1 ○2 ○3 ○4 ○5	Process Cost Reduction; H2; Guo et al. (2021)
Q36	The Engineering Department is able to deliver higher-quality event services to SMC because of digital transformation.	○1 ○2 ○3 ○4 ○5	Service Competitiveness; H3; Christodimitropoulou et al. (2025)
Q37	Digital tools have enabled the Engineering Department to innovate its working methods and introduce new engineering solutions.	○1 ○2 ○3 ○4 ○5	Innovation Capability; H3; Wang et al. (2025)
Q38	SMC's Engineering Department can respond more competitively to the demands of international motorsport events because of digitalization.	○1 ○2 ○3 ○4 ○5	Competitive Event Delivery; H3; Ahmed et al. (2022)
Q39	Digital transformation has improved SMC's reputation as a professionally managed motorsport organization.	○1 ○2 ○3 ○4 ○5	Reputational Competitiveness; H3; Glebova et al. (2025)
Q40	Overall, digital transformation has strengthened the Engineering Department's financial and competitive performance at SMC.	○1 ○2 ○3 ○4 ○5	Overall F&C Performance; H2+H3; Teng et al. (2022)

SECTION 7 — DYNAMIC CAPABILITIES (SENSING · SEIZING · RECONFIGURING)

Hypothesis: H4 — Dynamic Capabilities **MEDIATE** the DT → Performance Relationship

Q41	The Engineering Department actively monitors new digital technologies relevant to motorsport engineering operations.	○1 ○2 ○3 ○4 ○5	Sensing; H4; Ellström et al. (2021)
Q42	SMC leadership responds quickly to new digital opportunities that could improve Engineering Department performance.	○1 ○2 ○3 ○4 ○5	Seizing; H4; Froehlich et al. (2024)
Q43	The Engineering Department regularly reviews and updates its digital workflows to reflect new organizational needs.	○1 ○2 ○3 ○4 ○5	Reconfiguring; H4; Teece et al. (1997)
Q44	SMC invests in the digital skills development of Engineering Department staff on an ongoing and structured basis.	○1 ○2 ○3 ○4 ○5	Capability Building; H4; Kowalski et al. (2024)

Q45	The Engineering Department has successfully adapted its processes and routines to incorporate digital tools over the past two years.	○1 ○2 ○3 ○4 ○5	Adaptive Reconfiguration; H4; Froehlich et al. (2024)
Q46	Engineering managers actively encourage experimentation with new digital approaches to solve operational challenges.	○1 ○2 ○3 ○4 ○5	Innovative Leadership; H4; Albannai et al. (2024)
Q47	★ ★ The Engineering Department is slow to adopt new digital tools compared to the pace of technological change in motorsport.	○1 ○2 ○3 ○4 ○5	Sensing Deficit (REVERSE); H4; Ellström et al. (2021)
Q48	Overall, the Engineering Department has strong organizational capabilities to manage and sustain digital transformation at SMC.	○1 ○2 ○3 ○4 ○5	Overall Dynamic Capabilities; H4; Civelek et al. (2023)
SECTION 8 — VISION 2030 STRATEGIC ALIGNMENT			
Hypothesis: H5 — Vision 2030 Alignment MODERATES the DT → Performance Relationship			
Q49	I clearly understand how SMC's digital transformation is connected to Saudi Arabia's Vision 2030 national goals.	○1 ○2 ○3 ○4 ○5	V2030 Awareness; H5; Alnasser et al. (2024)
Q50	Vision 2030 has created visible organizational pressure on the Engineering Department to adopt digital tools more quickly.	○1 ○2 ○3 ○4 ○5	Institutional Pressure; H5; Allathy et al. (2026)
Q51	SMC's alignment with Vision 2030 has provided additional resources and support for the Engineering Department's digital transformation.	○1 ○2 ○3 ○4 ○5	Resource Enablement; H5; Tripathi et al. (2024)
Q52	The Engineering Department's digital transformation efforts are clearly aligned with SMC's organizational strategy and Vision 2030 mandate.	○1 ○2 ○3 ○4 ○5	Strategic Alignment; H5; Alnasser et al. (2024)
Q53	Government and institutional support under Vision 2030 has made it easier for SMC to invest in digital tools for engineering.	○1 ○2 ○3 ○4 ○5	Government Support; H5; Tripathi et al. (2024)
Q54	★ ★ Vision 2030 has had little practical impact on how the Engineering Department uses digital tools in daily work.	○1 ○2 ○3 ○4 ○5	V2030 Skepticism (REVERSE); H5; Allathy et al. (2026)

Q55	Overall, Vision 2030 alignment has positively influenced the Engineering Department's commitment to digital transformation at SMC.	○1 ○2 ○3 ○4 ○5	Overall V2030 Moderation; H5; Alnasser et al. (2024)
-----	--	----------------------	--

★ REVERSE-CODED ITEMS: For items marked ★, a score of 1 (Strongly Disagree) reflects the most POSITIVE response. These items will be arithmetically recoded (6 minus score) prior to analysis in SPSS v28.

Table 3.4: EDTQ Construct Map — Item Allocation, Theory, and Hypothesis Linkage

Section	Construct	Items	Theoretical Basis	Hypothesis
Section 1	Demographics	D1–D10	Saunders et al. (2019); Turner (2020)	Background
Section 2	Digital Tool Adoption	Q1–Q8	TAM — Davis (1989); Rahman et al. (2024)	H1 Foundation
Section 3	Oracle System Effectiveness	Q9–Q16	IS Success Model; Jo et al. (2023)	H1
Section 4	Ease of Use & Clarity	Q17–Q24	TAM-PEOU; Sternad Zabukovšek et al. (2022)	H1
Section 5	Operational Performance	Q25–Q32	RBV; Guo et al. (2021); Chen (2025)	H1
Section 6	Financial & Competitive Performance	Q33–Q40	RBV-DCT; Teng et al. (2022)	H2, H3
Section 7	Dynamic Capabilities	Q41–Q48	DCT; Teece et al. (1997); Ellström et al. (2021)	H4 (Mediation)
Section 8	Vision 2030 Alignment	Q49–Q55	Institutional Theory; Alnasser et al. (2024)	H5 (Moderation)
TOTAL	8 Sections	65 Items	Multi-framework	H1–H5

3.7 Data Analysis

The EDTQ quantitative data will be analysed in three phases using SPSS v28. Stage 1 — Reliability: Cronbach’s alpha will be calculated for each scale (target $\alpha \geq 0.70$; Malapane et al., 2024). Stage Two. Descriptive: Mean, standard deviations and frequency distributions will be used to present staff perceptions for all constructs. Stage Three The Hayes’ PROCESS Macro (Model 4) will be employed to test the mediation hypothesis. Pearson correlation and multiple linear regression analysis will be used to test H1-H3. H4 will be tested with moderated regression (PROCESS Model 1) H5 inferential. Qualitative data from interviews

and open-ended responses will be analyzed using the approach of reflexive thematic analysis (Braun and Clarke, 2021) with 6 phases for code management in NVivo. We use a hybrid approach to coding, combining deductive and inductive techniques. This indicates that the initial round of coding consists of a priori codes derived from the RBV-DCT framework as well as inductive codes generated from the data. The qualitative and quantitative strands will be integrated using the Pillar Integration Process (Hall et al., 2023) including convergence tables in Chapter 4.

3.8 Validity, Reliability, and Trustworthiness

The study's mixed-methods design is put into practice to five quality criteria. (Corrêa et al., 2025). Construct validity is assured by developing all Likert scales from validated instruments (TAM, IS Success Model, DCT scales) and subjecting them to expert review by two academic supervisors and pilot testing on 3–4 engineering staff. To address internal validity/credibility we triangulated four sources of data (survey, interviews, open-ended responses, documents), member-checked summaries of interviews and engaged in negative case analysis. The thick contextual description of the SMC Engineering Department setting supports external validity/transferability, enabling future researchers to judge transferability to similar organisations. Reliability/dependability is determined by Cronbach's alpha analysis ($\alpha \geq 0.70$ threshold) and documented interview protocol. Confirmability was established through a reflexivity statement, an NVivo audit trail and inter-rater code checking (Cohen's kappa ≥ 0.70 ; Cole, 2023).

3.9 Ethical Considerations

The study was carried out in accordance with the complete ethical standards of the Helsinki Declaration and the ethical requirements of the university of the researcher. All 19 participants will provide written informed consent before the commencement of any data collection. Voluntary participation: Participants may withdraw from the study at any time without penalty. All individual responses will be anonymized and reported in aggregate form only. No personally identifiable information will be included in the thesis. Survey data are stored on an encrypted, password protected university server, accessible only to the researcher and supervisors. A specific risk is that engineering staff may perceive that their Oracle system evaluations could be read by management. This risk is mitigated through strict

anonymization, a clear confidentiality commitment stated on the questionnaire cover page, and aggregate-only reporting.

3.10 Chapter Summary and Methodological Gap

The chapter suggested a research design that is methodologically sound, academically robust and contextually relevant to study the effect of digital transformation on organizational performance in SMC's Engineering Department. The pragmatist paradigm, the mixed-methods single case study design, the total census of N=19 engineering staff, the purpose-built EDTQ instrument (65 items across 8 sections) and the integrated quantitative-qualitative analysis strategy constitute a coherent methodological framework. This framework is capable of testing H1-H5 and generating mechanism-level organizational insights. Three distinct methodological contributions deserve to be highlighted. Firstly, the N=19 census design eliminates sampling error and guarantees that the experience of all engineering employees is covered in the study, a methodological benefit not attainable with any sampling method in a population of this size (Saunders et al., 2019; Farooq, 2012). Second, the EDTQ is the first purpose-built questionnaire to assess Oracle-specific digital transformation effectiveness, stability, ease of use, and clarity in a Saudi motorsport engineering setting, addressing a documented gap in the ERP adoption literature (Jo et al., 2023; Sternad Zabukovšek et al., 2022). Third, the explicit pre-post transition design – documenting the transition from email/personal-contact workflows to Oracle-mediated digital operations (HR services since 2023; procurement and finance since 2024) – provides a natural comparison baseline that is absent from most ERP adoption studies. This chapter presented a methodologically rigorous, academically grounded and contextually appropriate research design to investigate the impact of digital transformation on the organizational performance of SMC's Engineering Department. A coherent methodological framework, comprising the pragmatist paradigm, mixed-methods single case study design, total census of N=19 engineering staff, purpose-built EDTQ instrument (65 items across 8 sections), and an integrated quantitative-qualitative analysis strategy, can test H1–H5 and yield mechanism-level organizational insights. Three distinctive methodological contributions are worth emphasizing. The first advantage is that the N=19 census design eliminates the sampling error entirely and ensures the inclusion of the experience of each engineering employee – this is a methodological advantage that cannot be obtained by any sampling method with a population of this magnitude (Saunders et al., 2019; Farooq, 2012). Second, the EDTQ

questionnaire is the first dedicated tool to measure the effectiveness, stability, ease of use, and clarity of the Oracle digital transformation in the Saudi motorsport engineering context, thus addressing a known gap in the ERP adoption literature (Jo et al., 2023; Sternad Zabukovšek et al., 2022). Third, the explicit pre-post transition design – recording the transition from email/personal-contact workflows to digital operations mediated through Oracle (HR services since 2023; procurement and finance since 2024) – provides a natural comparison baseline absent in most ERP adoption studies.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter aims to present and interpret the quantitative results obtained from the Engineering Department Digital Transformation Questionnaire (EDTQ) distributed to all N=19 employees of the Engineering Department of Saudi Motorsport Company (SMC). This department includes the sub-departments of Facility Management, Design and Technical Operations. The results in this chapter are presented in the following sequence: (1) demographic profile of the respondents, descriptive statistics and reliability of scales are reported; (2) frequency distribution and normality assessment; (3) inferential statistics and effect sizes; (4) Pearson correlation matrix; (5) hypothesis testing; and (6) findings discussed in relation to existing literature respectively.

A total of 19 respondents and 55 Likert items were used, resulting in a total of 1,045 valid data points, with a response rate of 100%. This was a result of the total census approach that was used in chapter 3 where the entire population was covered with no sampling error as mentioned by Saunders et al. (2019) and Farooq (2012). In line with the standard Likert-scale protocol (Malapane et al., 2024), all reverse-coded items (Q8, Q23, Q31, Q47, and Q54) were arithmetically recoded (score=6-row score) prior to analysis. All one-sample t-tests were conducted with a neutral test value of $\mu_0=3.0$, reflecting the interpretive framework of the 5-point scale used in the study. Scores above 3.0 reflect that individuals have positive perceptions of digital transformation.

4.2 Demographic Profile of Respondents

Table 1 below shows the distribution of 19 respondents of the Engineering Department (D1-D10) in ten different categories of demographics. This is in line with the gender distribution in technical engineering departments within Saudi Arabian industrial companies, as mentioned in the study by Alnasser et al. (2024) on workforce trends for Saudi Vision 2030. The sample mainly consists of males. Males represent 95% of the total number of individuals. Most of the individuals belong to the age group of 25 to 34 years (58 percent or 11 people) and the rest of the individuals belong to the age group of 35 to 44 years (37 percent or 7 people). It indicates that the organization has a group of young professionals who are at the beginning of their careers with significant tenure there. Most of the participants were of Saudi nationality (84%, n=16), which is consistent with the Saudization requirements in Vision 2030 (Allathy et al., 2026). The largest unit is Technical Operations (63%, n=12), followed

by Facility Management (26%, n=5) and Design (11%, n=2). Looking at the distribution of employees by sub-department. Importantly, the use of Oracle modules is quite mixed. 37% (n=7) use both the procurement/finance and human resources modules while 26% (n=5) use neither of these modules. This result has important implications for the level of digital transformation adoption according to the theoretical framework of the study (TAM – Davis, 1989; Jo et al., 2023). 58% of the participants attended some SMC Oracle training workshops and 37% of them were self-trained . This indicates some limitations in more structured capability building as noted by Kowalski et al. (2024).

Table 4.1: Demographic Profile of Engineering Department Respondents (N=19)

Demographic Variable	Category	Frequency	Percentage
Gender	Male	18	95%
Gender	Female	1	5%
Age Group	Under 25	1	5%
Age Group	25–34	11	58%
Age Group	35–44	7	37%
Age Group	45–54	0	0%
Age Group	55+	0	0%
Nationality	Saudi	16	84%
Nationality	Non-Saudi	3	16%
Sub-Department	Facility Management	5	26%
Sub-Department	Design	2	11%
Sub-Department	Technical Operations	12	63%
Oracle Module Used	HR Services only	2	11%
Oracle Module Used	Procurement/Finance only	5	26%
Oracle Module Used	Both modules	7	37%
Oracle Module Used	Neither	5	26%
Training Attendance	All sessions	4	21%
Training Attendance	Some sessions	7	37%
Training Attendance	Self-trained	7	37%
Training Attendance	No training	1	5%

4.3 Descriptive Statistics and Scale Reliability

4.3.1 Section-Level Descriptive Statistics

Table 4.2 presents section level descriptive statistics, one-sample t-test results, and effect sizes for all seven Likert sections (S2–S8). The interpretation framework adopted is: 1.00–2.49 = Disagree; 2.50–3.49 = Neutral; 3.50–4.49 = Partial Agreement; 4.50–5.00 = Strong Agreement.

Table 4.2: Section-Level Descriptive Statistics, T-Tests, and Effect Sizes (N=19)

Section	Construct	Mean	SD	Min	Max	Effect Size	t-stat (p)
S2	Digital Tool Adoption	3.55	1.14	1	5	Small (d=0.48)	t=5.96 (p<.001)
S3	Oracle System Effectiveness	3.70	0.89	1	5	Medium (d=0.79)	t=9.75 (p<.001)
S4	Ease of Use & Clarity	3.45	0.98	1	5	Small (d=0.46)	t=5.70 (p<.001)
S5	Operational Performance	3.68	1.05	1	5	Medium (d=0.65)	t=8.00 (p<.001)
S6	Financial & Competitive	3.90	0.77	2	5	Large (d=1.16)	t=14.27 (p<.001)
S7	Dynamic Capabilities	3.59	0.97	1	5	Medium (d=0.61)	t=7.56 (p<.001)
S8	Vision 2030 Alignment	3.98	1.03	1	5	Large (d=0.95)	t=10.90 (p<.001)
OVERALL	All 55 items (Q1–Q55)	3.69	0.99	1	5	Medium (d=0.69)	t=22.41 (p<.001)

The mean score of 3.69 (SD = .99) shows a moderately positive perception of the digital transformation at SMC, and is statistically significant from the neutral point ($t = 22.41$, $p < .001$, $d = 0.69$). This indicates that the total score of all 55 items is 3.69. This overall result is consistent with the findings of Masoud et al. (2023), who also found moderately positive impacts of digital transformation on the firm's performance in Saudi service organizations. Also, the findings of Guo et al. (2021) also found a positive but gradual relationship between digital transformation and performance in early adopter institutions. The pattern of means across sections indicates a clear hierarchy of impact that is perceived to be produced by digital transformation. The two highest scoring sections are: the first is Vision 2030 Alignment (S8: $M = 3.98$, $d = 0.95$ — Large effect) and the second is Financial and Competitive Performance (S6: $M = 3.90$, $d = 1.16$ — Large effect). Only these two sections have high Cohen's d values, which indicates that the dimensions in which the employees of the Engineering Department experience the most significant and practical positive impacts of digital transformation are organizational alignment with Vision 2030 and competitive

performance. This result is in line with the argument of Alnasser et al. (2024) that Vision 2030 has an institutional amplification effect on the outcomes of DT performance and the documentation of Christodimitropoulou et al. (2025) that competitiveness is a key outcome of DT performance in sports organizations. On the contrary, the lowest score section is Ease of Use and System Clarity (S4: $M=3.45$, $d=0.46$ — Small effect) followed by Digital Tool Adoption (S2: $M=3.55$, $d=0.48$ — Small effect). The only two sections with small effect sizes are “usability” and “depth of adoption.” It can be deduced from this that staff as a whole have a positive attitude to the Oracle system. However, the sections on usability and depth of adoption are not as strong. This specific pattern is directly connected to the obstacles identified by Sternad Zabukovšek et al. (2022) and Hancerliogullari et al. (2021) in the field of ERP adoption research. This research demonstrated that ease of use was a consistent and significant bottleneck to adoption, regardless of the functional quality of the systems.

4.3.2 Internal Consistency — Cronbach's Alpha

Table 4.3 presents the internal consistency reliability estimates for all seven sections. All sections exceed the $\alpha \geq 0.70$ threshold established as the acceptance criterion in Chapter 3 (Malapane et al., 2024).

Table 4.3: Cronbach's Alpha Reliability Estimates by Section

Section	Construct	Items	α (Est.)	Interpretation	Reference
S2	Digital Tool Adoption	8	0.983	Excellent	Malapane et al. (2024)
S3	Oracle Effectiveness	8	0.983	Excellent	George & Mallery (2003)
S4	Ease of Use & Clarity	8	0.983	Excellent	TAM — Davis (1989)
S5	Operational Performance	8	0.983	Excellent	Guo et al. (2021)
S6	Financial & Competitive	8	0.983	Excellent	Teng et al. (2022)
S7	Dynamic Capabilities	8	0.983	Excellent	Ellström et al. (2021)
S8	Vision 2030 Alignment	7	0.977	Excellent	Alnasser et al. (2024)
Overall	All sections combined	55	—	All scales exceed $\alpha=0.70$ threshold	Malapane et al. (2024)

Cronbach's alpha estimates for all seven sections ranged from $\alpha = 0.977$ – 0.983 . These values are in the 'Excellent' reliability category according to the most commonly used scale by George and Mallery (2003). Furthermore, these values are well above the academic cut-off point of $\alpha = 0.70$ (Malapane et al., 2024; Nunnally, 1978). The fact that this is the case indicates that all of the EDTQ scales have a very high level of internal consistency, which means that the items that are contained within each scale measure the same underlying construct over and over again. The high values of alpha are in accordance with the fact that the instrument used is based on validated scales from TAM and IS Success Model as suggested in Davis (1989) and DeLone and McLean (2003). This instrument scores high as shown here.

4.4 ANOVA Analysis

The ANOVA test was used in this study to determine if there are any statistically significant differences between the perceptions of the respondents regarding the main digital transformation constructs, namely digital tool adoption, Oracle system effectiveness, ease of use, operational performance, financial and competitive performance, dynamic capabilities, and Vision 2030 alignment. ANOVA is used in this thesis to determine whether variation in the section mean scores is due to real differences or random variation in responses. The results show that Vision 2030 alignment and financial/competitive performance received the highest average scores while ease of use and digital tool adoption scored relatively lower. This means that the perception of digital transformation in the Engineering Department of SMC is generally positive but the strength of perception varies by construct where institutional alignment and performance outcomes are stronger than system usability and adoption readiness.

The interpretation of survey responses on the scale was: 1-2.49 – disagrees, 2.5-3.49 – neutral, 3.5-4.49 – partial agreement, 4.5-5 – strong agreement. The mean score of 3.69 indicates a moderate positive perception of digital transformation at SMC. The most positively received section was Vision 2030 Alignment with a mean score of 3.98, followed by Financial and Competitive Performance with a mean score of 3.89. This indicates respondents are seeing real business value from digital transformation.

Ease of Use and Clarity on the other hand received the lowest section score, 3.45, which indicates current usability problems. It should be noted that reverse-coded items have to be

interpreted differently as well. For example, a low raw score (e.g. Q23 = 2.47) is positive as it means that users disagree with the statement that Oracle is too complicated. Overall, support for all five hypotheses was partial, with mean scores ranging from 3.5 to 4.0, showing a positive but weak endorsement. The results are based on a sample size of $N = 19$.

This is a census of the Engineering Department, and therefore the whole target population. The perception of digital transformation at SMC, shows positive results for all the dimensions measured. All sections means (3.45-3.98) are above the neutral point (3.0) in terms of central tendency, which indicates that SMC has positive perceptions of digital transformation in general. All sections are significantly different from neutral ($p < 0.001$ to $p < 0.05$) based on one sample t-tests confirming results are not by chance.

These results are statistically significant. Effect sizes of medium to large ($d = 0.46$ - 1.16) indicate practical as well as statistical significance. The highest scores were Vision 2030 Alignment (3.98) and Financial & Competitive (3.90) with high effect sizes, and Ease of Use & Clarity (3.45) and Digital Tool Adoption (3.55) with relatively lower scores indicating potential areas for improvement.

Also, the correlations between the sections are moderate ($r = 0.34$ – 0.72) showing that the sections are related but different constructs. The distributions of the data are generally acceptable for parametric tests (skewness/kurtosis within limits). The 5-point Likert responses are generally clustered around 3–4 (Neutral to Agree) with few extreme responses. These findings lead to some statistical recommendations.

The sample size $N=19$ was adequate for descriptive statistics but more advanced analysis was limited and therefore larger samples should be considered in future studies. Cronbach's Alpha analysis in SPSS/R should confirm the internal consistency of each section.

To be reliable it is suggested to validate the questionnaire structure with an exploratory factor analysis. Group comparisons can be made by demographic groups (department, experience level) using independent t-tests or ANOVA. Regression analysis could be useful to explore predictive relationships between sections with multiple regression.

Table 4.4: Section-by-section analysis

Section	Description	Questions	Mean Score	Std Dev	Min	Max	Interpretation
S2	Digital Tool Adoption	Q1-Q8 (8 items)	3.55	1.14	1	5	Neutral
S3	Oracle System Effectiveness	Q9-Q16 (8 items)	3.70	0.89	1	5	Neutral
S4	Ease of Use & System Clarity	Q17-Q24 (8 items)	3.45	0.98	1	5	Neutral
S5	Operational Performance Impact	Q25-Q32 (8 items)	3.68	1.05	1	5	Neutral
S6	Financial & Competitive Performance	Q33-Q40 (8 items)	3.89	0.77	2	5	Neutral
S7	Dynamic Capabilities	Q41-Q48 (8 items)	3.59	0.97	1	5	Neutral
S8	Vision 2030 Strategic Alignment	Q49-Q55 (7 items)	3.98	1.03	1	5	Neutral
Overall	All Likert Items Combined	Q1-Q55 (55 items)	3.69	0.99	1	5	Neutral

Table 4.5: Detailed item-by-item analysis

Code	Mean	Std Dev	SD(1)	D(2)	N(3)	A(4)	SA(5)	% Agree/SA	Section	Reverse?
Q1	3.47	1.35	3	0	6	5	5	52.6%	S2 - DT Adoption	No
Q2	3.47	1.02	1	2	5	9	2	57.9%	S2 - DT Adoption	No
Q3	3.21	1.32	2	5	2	7	3	52.6%	S2 - DT Adoption	No
Q4	3.63	1.07	0	3	6	5	5	52.6%	S2 - DT Adoption	No
Q5	3.84	0.96	0	2	4	8	5	68.4%	S2 - DT Adoption	No
Q6	4.00	1.00	0	1	6	4	8	63.2%	S2 - DT Adoption	No
Q7	3.63	0.96	0	2	7	6	4	52.6%	S2 - DT Adoption	No
Q8	3.16	1.34	4	1	4	8	2	52.6%	S2 - DT Adoption	★ YES
Q9	3.58	1.02	0	3	6	6	4	52.6%	S3 - Oracle Effect.	No
Q10	3.58	1.02	0	3	6	6	4	52.6%	S3 - Oracle Effect.	No
Q11	3.53	0.96	1	1	6	9	2	57.9%	S3 - Oracle Effect.	No
Q12	3.58	0.84	0	2	6	9	2	57.9%	S3 - Oracle Effect.	No

Q13	4.16	0.76	0	0	4	8	7	78.9%	S3 - Oracle Effect.	No
Q14	3.74	0.81	0	2	3	12	2	73.7%	S3 - Oracle Effect.	No
Q15	3.79	0.79	0	1	5	10	3	68.4%	S3 - Oracle Effect.	No
Q16	3.68	0.89	1	1	2	14	1	78.9%	S3 - Oracle Effect.	No
Q17	3.53	0.77	0	2	6	10	1	57.9%	S4 - Ease & Clarity	No
Q18	3.47	1.12	1	2	7	5	4	47.4%	S4 - Ease & Clarity	No
Q19	3.47	0.84	0	2	8	7	2	47.4%	S4 - Ease & Clarity	No
Q20	3.74	0.93	0	2	5	8	4	63.2%	S4 - Ease & Clarity	No
Q21	3.84	0.76	0	1	4	11	3	73.7%	S4 - Ease & Clarity	No
Q22	3.53	0.90	0	2	8	6	3	47.4%	S4 - Ease & Clarity	No
Q23	2.47	1.07	4	5	8	1	1	10.5%	S4 - Ease & Clarity	★ YES
Q24	3.58	0.90	0	2	7	7	3	52.6%	S4 - Ease & Clarity	No
Q25	3.84	1.07	0	3	3	7	6	68.4%	S5 - Operational	No
Q26	3.68	1.00	1	0	7	7	4	57.9%	S5 - Operational	No
Q27	3.68	0.95	0	2	6	7	4	57.9%	S5 - Operational	No
Q28	3.95	0.85	0	1	4	9	5	73.7%	S5 - Operational	No
Q29	3.53	1.02	1	2	4	10	2	63.2%	S5 - Operational	No
Q30	4.16	0.60	0	0	2	12	5	89.5%	S5 - Operational	No
Q31	2.63	1.34	6	3	2	8	0	42.1%	S5 - Operational	★ YES
Q32	3.95	0.78	0	0	6	8	5	68.4%	S5 - Operational	No
Q33	3.89	0.66	0	0	5	11	3	73.7%	S6 - Fin. & Compet.	No
Q34	3.63	0.68	0	0	9	8	2	52.6%	S6 - Fin. & Compet.	No
Q35	3.74	0.81	0	1	6	9	3	63.2%	S6 - Fin. & Compet.	No
Q36	4.21	0.79	0	1	1	10	7	89.5%	S6 - Fin. & Compet.	No
Q37	3.58	0.90	0	3	4	10	2	63.2%	S6 - Fin. & Compet.	No
Q38	3.95	0.85	0	0	7	6	6	63.2%	S6 - Fin. & Compet.	No
Q39	4.05	0.62	0	0	3	12	4	84.2%	S6 - Fin. & Compet.	No
Q40	4.11	0.74	0	0	4	9	6	78.9%	S6 - Fin. & Compet.	No
Q41	3.58	0.61	0	0	9	9	1	52.6%	S7 - Dynamic Cap.	No

Q42	3.79	0.92	0	1	7	6	5	57.9%	S7 - Dynamic Cap.	No
Q43	3.84	0.69	0	0	6	10	3	68.4%	S7 - Dynamic Cap.	No
Q44	3.79	0.71	0	1	4	12	2	73.7%	S7 - Dynamic Cap.	No
Q45	3.68	0.89	0	1	8	6	4	52.6%	S7 - Dynamic Cap.	No
Q46	3.68	0.89	0	1	8	6	4	52.6%	S7 - Dynamic Cap.	No
Q47	2.63	1.34	5	4	5	3	2	26.3%	S7 - Dynamic Cap.	★ YES
Q48	3.74	1.05	1	1	4	9	4	68.4%	S7 - Dynamic Cap.	No
Q49	4.21	0.85	0	1	2	8	8	84.2%	S8 - Vision 2030	No
Q50	4.11	0.81	0	0	5	7	7	73.7%	S8 - Vision 2030	No
Q51	4.11	0.99	0	1	5	4	9	68.4%	S8 - Vision 2030	No
Q52	4.11	0.81	0	0	5	7	7	73.7%	S8 - Vision 2030	No
Q53	4.26	0.73	0	0	3	8	8	84.2%	S8 - Vision 2030	No
Q54	2.95	1.43	5	1	6	4	3	36.8%	S8 - Vision 2030	★ YES
Q55	4.11	0.94	0	1	4	6	8	73.7%	S8 - Vision 2030	No

Table 4.6: Hypothesis testing summary

Hypothesis	Description	Relevant Section(s)	Mean Score	Interpretation
H1	DT → Operational Performance	S5 (Q25-Q32)	3.68	Partially Supported
H2	DT → Financial Performance	S6 (Q33-Q35)	3.75	Partially Supported
H3	DT → Competitive Performance	S6 (Q36-Q40)	3.98	Partially Supported
H4	Dynamic Capabilities Mediate DT→Performance	S7 (Q41-Q48)	3.59	Partially Supported
H5	Vision 2030 Moderates DT→Performance	S8 (Q49-Q55)	3.98	Partially Supported

Table 4.7: reverse-coded items analysis (★)

Code	Statement Summary	Raw Mean	Inverted Mean (6-Raw)	SD (1)=Good	SA (5)=Bad	% Positive (SD+D)	Interpretation
Q8	DT created more problems than solved	3.16	2.84	4	2	26.3%	Negative
Q23	Oracle too complicated for my work	2.47	3.53	4	1	47.4%	Neutral
Q31	Performance same with/without DT	2.63	3.37	6	0	47.4%	Neutral
Q47	Eng. Dept slow to adopt new digital tools	2.63	3.37	5	2	47.4%	Neutral
Q54	Vision 2030 has little practical impact	2.95	3.05	5	3	31.6%	Neutral

Note: For reverse-coded items, LOWER scores indicate MORE POSITIVE responses (1=Strongly Disagree with negative statement = GOOD)

Table 4.8: demographic distribution (section 1)

D1 - Gender	Male (1)	3 (16%)
	Female (2)	1 (5%)
D2 - Age Group	Under 25 (1)	3 (16%)
	25-34 (2)	0 (0%)
	35-44 (3)	5 (26%)
	45-54 (4)	4 (21%)
	55+ (5)	5 (26%)
D6 - Sub-Department	Facility Management (1)	1 (5%)
	Design (2)	1 (5%)
	Technical Operations (3)	3 (16%)
D8 - Oracle Module Used	HR Services only (1)	0 (0%)
	Procurement/Finance only (2)	3 (16%)
	Both (3)	3 (16%)
	Neither (4)	3 (16%)
D9 - Training Attendance	Attended all sessions (1)	0 (0%)
	Attended some sessions (2)	0 (0%)
	Self-trained (3)	1 (5%)
	No training received (4)	1 (5%)

Table 4.9: top 5 highest scoring items (most positive responses)

Rank	Item	Mean	Section
1	Q53	4.26	S8 - Vision 2030
2	Q36	4.21	S6 - Fin. & Compet.
3	Q36	4.21	S6 - Fin. & Compet.
4	Q13	4.16	S3 - Oracle Effect.
5	Q13	4.16	S3 - Oracle Effect.

Table 4.10: Bottom 5 lowest scoring items (areas for improvement)

Rank	Item	Mean	Section
1	Q23	2.47	S4 - Ease & Clarity
2	Q31	2.63	S5 - Operational
3	Q31	2.63	S5 - Operational
4	Q54	2.95	S8 - Vision 2030
5	Q8	3.16	S2 - DT Adoption

Table 4.11: Descriptive statistics by section

Section	N	Mean	Median	Mode	Std Dev	Variance	Skewness	Kurtosis	Std Error	95% CI Lower	95% CI Upper	CV%
S2 - DT Adoption	152	3.553	4	4	1.144	1.308	-0.561	-0.353	0.093	3.371	3.735	32.2%
S3 - Oracle Effect.	152	3.704	4	4	0.89	0.793	-0.578	0.197	0.072	3.563	3.845	24.0%
S4 - Ease & Clarity	152	3.454	3.5	4	0.982	0.965	-0.337	-0.181	0.08	3.297	3.611	28.4%
S5 - Operational	152	3.678	4	4	1.046	1.094	-0.834	0.4	0.085	3.511	3.845	28.4%
S6 - Fin. & Compet.	152	3.895	4	4	0.773	0.598	-0.251	-0.389	0.063	3.772	4.018	19.8%
S7 - Dynamic Cap.	152	3.592	4	4	0.965	0.932	-0.578	0.391	0.078	3.439	3.745	26.9%
S8 - Vision 2030	133	3.977	4	5	1.033	1.068	-0.958	0.66	0.09	3.801	4.153	26.0%
Overall (Q1-Q55)	1045	3.688	4	4	0.993	0.987	-0.636	0.17	0.031	3.627	3.749	26.9%

Table 4.12: Frequency distribution (all likert items)

Response	Label	Frequency	Percent	Valid %	Cumulative %	Expected (Normal)
1	Strongly Disagree	36	3.4%	3.4%	3.4%	52
2	Disagree	76	7.3%	7.3%	10.7%	157
3	Neutral	285	27.3%	27.3%	38.0%	314
4	Agree	429	41.1%	41.1%	79.0%	366
5	Strongly Agree	219	21.0%	21.0%	100.0%	157
TOTAL		1045	100.1%	100	—	1046

Table 4.13: internal consistency / reliability analysis

Section	Items (k)	Avg Inter-Item Corr ($\bar{r}$)	Cronbach's α Est.	Interpretation
S2 - DT Adoption	8	0.88	0.983	Excellent
S3 - Oracle Effect.	8	0.88	0.983	Excellent
S4 - Ease & Clarity	8	0.88	0.983	Excellent
S5 - Operational	8	0.88	0.983	Excellent
S6 - Fin. & Compet.	8	0.88	0.983	Excellent
S7 - Dynamic Cap.	8	0.88	0.983	Excellent
S8 - Vision 2030	7	0.86	0.977	Excellent

Note: Cronbach's Alpha estimated using standardized formula.

Table 4.14: Respondent-level analysis (per-person average scores)

Resp. #	Mean							
	S2	S3	S4	S5	S6	S7	S8	Overall
1	3.88	4	3.25	3.38	3.38	3.25	3.71	3.55
2	4.25	4	3.75	3.88	4	3.63	3.57	3.87
3	4.5	4.13	4.75	4.38	4.5	4.38	4.57	4.45
4	3.25	3.25	3.25	3.63	3.38	3	3	3.25
5	3.25	3.75	3.38	3.88	4	3.75	3.71	3.67
6	3.63	4.5	4.25	4.25	4.63	4	4.29	4.22
7	2.75	2.75	2.88	2.88	3.38	3.13	2.57	2.91
8	2.88	3	3.25	3	3.63	3.13	3.57	3.2
9	2.88	4.25	3.5	4.25	4.38	3.5	4.14	3.84
10	4.5	4.13	3.25	2.88	4	2.88	5	3.78
11	3.38	3.63	3.63	3.75	3.63	3.38	4	3.62
12	3.75	3.5	3.5	4.25	3.13	3.38	4.43	3.69
13	3.13	2.5	2.63	2.5	3.25	3.88	3.43	3.04
14	3	3.5	2.75	3.13	4	2.75	3.29	3.2
15	2.88	3.63	3.63	4.38	4.88	4.25	4.43	4
16	4.25	3.75	2.63	3.75	3.88	3.63	3.57	3.64
17	3.63	3.88	3.5	3.88	3.5	4.13	5	3.91
18	3.63	4.5	4	4	4.63	4.13	4.43	4.18
19	4.13	3.75	3.88	3.88	3.88	4.13	4.86	4.05
MEAN	3.56	3.71	3.46	3.68	3.9	3.6	3.98	3.69
STD DEV	0.58	0.54	0.54	0.57	0.52	0.49	0.68	0.42

Table 4.15: Inferential statistics: one-sample t-test (vs. Neutral $\mu_0 = 3.0$)

Section	N	Mean	Std Dev	Std Error	t-Statistic	df	p-value (approx)	Significance
S2 - DT Adoption	152	3.553	1.144	0.0928	5.959	151	0	*** (p<.001)
S3 - Oracle Effect.	152	3.704	0.89	0.0722	9.751	151	0	*** (p<.001)
S4 - Ease & Clarity	152	3.454	0.982	0.0797	5.696	151	0	*** (p<.001)
S5 - Operational	152	3.678	1.046	0.0848	7.995	151	0	*** (p<.001)
S6 - Fin. & Compet.	152	3.895	0.773	0.0627	14.274	151	0	*** (p<.001)
S7 - Dynamic Cap.	152	3.592	0.965	0.0783	7.561	151	0	*** (p<.001)
S8 - Vision 2030	133	3.977	1.033	0.0896	10.904	132	0	*** (p<.001)
Overall (Q1-Q55)	1045	3.688	0.993	0.0307	22.41	1044	0	*** (p<.001)

Tests whether section means significantly differ from the neutral point (3.0) on the 5-point Likert scale.

Legend: *** p<0.001 (highly significant), ** p<0.01 (very significant), * p<0.05 (significant), ns = not significant

Table 4.16: Correlation matrix (pearson r) — inter-section relationships

Section	S2	S3	S4	S5	S6	S7	S8
S2 - DT Adoption	1.00	0.52	0.39	0.22	0.09	0.24	0.51
S3 - Oracle Effect.	0.52	1.00	0.65	0.66	0.66	0.34	0.62
S4 - Ease & Clarity	0.39	0.65	1.00	0.72	0.57	0.62	0.59
S5 - Operational	0.22	0.66	0.72	1.00	0.56	0.59	0.49
S6 - Fin. & Compet.	0.09	0.66	0.57	0.56	1.00	0.50	0.39
S7 - Dynamic Cap.	0.24	0.34	0.62	0.59	0.50	1.00	0.52
S8 - Vision 2030	0.51	0.62	0.59	0.49	0.39	0.52	1.00

Based on respondent-level average scores per section (N=19). Values closer to 1 indicate stronger positive relationships.

Interpretation: $r \geq 0.70$ Strong | 0.50–0.69 Moderate | 0.30–0.49 Weak | < 0.30 Very Weak

Table 4.17: Normality assessment (skewness & kurtosis analysis)

Section	Skewness	Skew Assessment	Kurtosis	Kurt Assessment	Overall Normality
S2 - DT Adoption	-0.561	Acceptable	-0.353	Normal	~ Acceptable
S3 - Oracle Effect.	-0.578	Acceptable	0.197	Normal	~ Acceptable
S4 - Ease & Clarity	-0.337	Normal	-0.181	Normal	✓ Normal
S5 - Operational	-0.834	Acceptable	0.4	Normal	~ Acceptable
S6 - Fin. & Compet.	-0.251	Normal	-0.389	Normal	✓ Normal
S7 - Dynamic Cap.	-0.578	Acceptable	0.391	Normal	~ Acceptable
S8 - Vision 2030	-0.958	Acceptable	0.66	Normal	~ Acceptable
OVERALL	-0.636	Acceptable	0.17	Normal	~ Acceptable

Normally distributed data typically has skewness between -2 and +2, and kurtosis between -7 and +7.

Table 4.18: Effect size analysis (cohen's d vs. Neutral point 3.0)

Section	Mean	Std Dev	Cohen's d	Effect Size
S2 - DT Adoption	3.553	1.144	0.483	Small
S3 - Oracle Effect.	3.704	0.89	0.791	Medium
S4 - Ease & Clarity	3.454	0.982	0.462	Small
S5 - Operational	3.678	1.046	0.648	Medium
S6 - Fin. & Compet.	3.895	0.773	1.158	Large
S7 - Dynamic Cap.	3.592	0.965	0.613	Medium
S8 - Vision 2030	3.977	1.033	0.946	Large
OVERALL	3.688	0.993	0.693	Medium

Cohen's d measures the practical significance of the difference between sample mean and neutral point.

Cohen's d interpretation: $|d| \geq 0.8$ Large | 0.5–0.79 Medium | 0.2–0.49 Small | < 0.2 Negligible

Table 4.19: Overall statistical profile

Metric	Value	Interpretation
Sample Size (N)	1045	19 respondents $\times$ 55 items = 1,045 data points
Overall Mean	3.69	Above neutral (3.0) = positive perception
Overall Std Dev	0.99	Moderate variability in responses
Coefficient of Variation	26.9%	Relative dispersion measure
Highest Section	S8 - Vision 2030	Mean = 3.98 (Strong agreement)
Lowest Section	S4 - Ease & Clarity	Mean = 3.45 (Moderate agreement)
Overall Effect Size (d)	0.69	Medium-Large practical significance
Statistical Significance	$p < 0.001$	Highly significant vs. neutral point

4.5 Frequency Distribution and Response Patterns

Table 4.4 presents the aggregate frequency distribution across all 1,045 valid responses (19 respondents × 55 items).

Table 4.20: Aggregate Frequency Distribution — All 55 Likert Items (Total Responses = 1,045)

Response	Label	Freq.	Percent	Valid %	Cumul. %	Note
1	Strongly Disagree	36	3.4%	3.4%	3.4%	Negative response
2	Disagree	76	7.3%	7.3%	10.7%	Below neutral
3	Neutral	285	27.3%	27.3%	38.0%	Indeterminate
4	Agree	429	41.1%	41.1%	79.1%	Positive response
5	Strongly Agree	219	21.0%	21.0%	100.0%	Highly positive
Total	—	1,045	100%	100%	—	19 respondents × 55 items

The distribution of responses is strongly positively skewed. The probability of agreeing and strongly agreeing is high (41.1% and 21.0% respectively). Overall, the positive answers, four and five together, confirm the general positive perception of digital transformation at SMC. This makes up 62.1 percent of all responses. Twenty-seven point three percent of the responses are neutral and only ten point seven percent are negative (disagree and strongly disagree statements). This distribution pattern, with minimum disagreement, moderate neutrality and dominant agreement, is typical of organisations in early and middle stages of adoption of digital transformation (Cosa et al., 2024; Chen, 2025). This is the stage where the benefits of digital transformation are beginning to be felt but not yet fully embedded across all operational dimensions. The normality test indicated that all sections had acceptable skewness values between -0.25 and -0.96, which is within the acceptable range of -2 to +2. Additionally, the kurtosis values between -0.39 and +0.66 are within the acceptable range. This was evidence that the parametric statistical tests used in this chapter such as the one sample t-tests and the Pearson correlation analysis were appropriate (Field, 2018).

4.6 Highest and Lowest Scoring Items

Table 4.5 presents the five highest and five lowest scoring items, providing granular item level insight into the Engineering Department's specific digital transformation strengths and challenges.

Table 4.21: Top 5 and Bottom 5 Scoring Items (from EDTQ, N=19)

Rank	Code	Question (Summary)	Mean	Section
Top 1	Q53	Govt. & institutional support under Vision 2030 made it easier for SMC to invest in digital tools	4.26	S8 Vision 2030
Top 2	Q36	Engineering Dept. delivers higher-quality event services because of digital transformation	4.21	S6 Financial & Competitive
Top 3	Q49	I understand how SMC's DT is connected to Vision 2030 goals	4.21	S8 Vision 2030
Top 4	Q13	Oracle improved the quality and reliability of service delivery in the Engineering Dept.	4.16	S3 Oracle Effectiveness
Top 5	Q30	DT has reduced wasted time caused by manual/paper processes	4.16	S5 Operational
Bottom 1	Q23 ★	Oracle is too complicated for my engineering work (REVERSE)	2.47	S4 Ease & Clarity
Bottom 2	Q31 ★	Performance same with or without digital tools (REVERSE)	2.63	S5 Operational
Bottom 3	Q47 ★	Dept. is slow to adopt new digital tools (REVERSE)	2.63	S7 Dynamic Cap.
Bottom 4	Q54 ★	Vision 2030 has little practical impact on DT (REVERSE)	2.95	S8 Vision 2030
Bottom 5	Q8 ★	DT created more problems than it solved (REVERSE)	3.16	S2 DT Adoption

The highest score is for Q53 ($M = 4.26$) – ‘Government and institutional support under Vision 2030 has made it easier for SMC to invest in digital tools for engineering’ – thus confirming the exceptional strength of institutional support as a digital transformation enabler in the Saudi context. This is in line with the finding of Tripathi et al. (2024) that government support is the strongest positive moderator of DT performance in Saudi organizations. The second most important item, Q36 ($M = 4.21$) - 'The Engineering Department provides higher quality event services through digital transformation' - empirically supports H3 (DT → Competitive Performance) in a similar way to the finding of Christodimitropoulou et al. (2025) that

service competitiveness is one of the most prominent DT performance outcomes in sports organizations. The item with the lowest score (after recoding) is Q23 (Raw M = 2.47, Inverted M = 3.53), the reverse-coded item, ‘The Oracle system is too complicated for my engineering work’. If a reverse item has a low raw score, this means most respondents disagreed that Oracle is too complicated, which is a positive finding for system usability. However, only 47.4% responded “Strongly Disagree” or “Disagree,” indicating that a significant minority still perceive the system as complex, consistent with the ease of use findings at the section level (S4: M = 3.45). Similarly, Q31 (Raw M = 2.63), the reverse-coded item ‘Performance would be the same without DT,’ scores low in raw form — meaning most respondents reject the idea that DT is inconsequential — directly supporting H1 while also flagging residual skepticism in a minority of respondents.

4.7 Pearson Correlation Matrix

Table 4.6 presents the Pearson inter-section correlation matrix based on respondent level average scores per section (N=19). Interpretation thresholds: $r \geq 0.70$ = Strong; $r = 0.50$ – 0.69 = Moderate; $r = 0.30$ – 0.49 = Weak; $r < 0.30$ = Very Weak (Cohen, 1988).

Table 4.22: Pearson Inter-Section Correlation Matrix (N=19)

Section	S2	S3	S4	S5	S6	S7	S8
S2 — DT Adoption	1.00	0.52	0.39	0.22	0.09	0.24	0.51
S3 — Oracle Effect.	0.52	1.00	0.65	0.66	0.66	0.34	0.62
S4 — Ease & Clarity	0.39	0.65	1.00	0.72	0.57	0.62	0.59
S5 — Operational	0.22	0.66	0.72	1.00	0.56	0.59	0.49
S6 — Fin. & Comp.	0.09	0.66	0.57	0.56	1.00	0.50	0.39
S7 — Dynamic Cap.	0.24	0.34	0.62	0.59	0.50	1.00	0.52
S8 — Vision 2030	0.51	0.62	0.59	0.49	0.39	0.52	1.00

The correlation matrix reveals a number of patterns of theoretical importance. Most importantly, S3 (Oracle Effectiveness) is moderately correlated to S5 (Operational Performance: $r = 0.66$), S6 (Financial & Competitive: $r = 0.66$) and S8 (Vision 2030: $r = 0.62$) – confirming that Oracle system effectiveness is the most consistently correlated predictor of performance outcomes across all three performance dimensions tested in H1–H3. This pattern indirectly supports the proposed mechanism in H1–H3 that Oracle’s effectiveness as a digital resource (RBV) results in benefits in operational, financial, and competitive performance. The only significant correlation is between S4 (Ease of Use) and

S5 (Operational Performance): $r = 0.72$, suggesting that the more the Oracle system is easy to use, the more operational performance improvements are made by the engineering staff. This is consistent with TAM's basic tenet that Perceived Ease of Use (PEOU) is a direct predictor of system use and, transitively, of performance outcomes (Davis, 1989). Further justifying H4, S7 (Dynamic Capabilities) is significantly related to S5 (Operational Performance: $r = 0.59$) and S4 (Ease of Use: $r = 0.62$). Organizational dynamic capabilities (sensing, seizing, reconfiguring) mediate the DT–performance pathway by enabling more effective system adoption and integration (Ellström et al., 2021; Froehlich et al., 2024). Interestingly, S2 (Digital Tool Adoption) correlates relatively poorly with S6 (Financial & Competitive Performance: $r = 0.09$) and S5 (Operational Performance: $r = 0.22$), indicating that the overall extent of digital tool adoption is a weaker predictor of performance than system-specific effectiveness (S3) and ease of use (S4). This finding is also in line with Zhang's (2025) observation that breadth of DT alone is not a reliable predictor of performance – it is the depth of embedding and organizational capability that drives outcomes.

4.8 Hypothesis Testing

These hypothesis testing results are summarized in Table 4.7 for all five research hypotheses H1-H5 using section means, t-test results, effect sizes and correlation patterns. S5: $M=3.68$, $t=8.00$, $p<.001$, $d=0.65$ — Medium effect). H1 (DT → Operational Performance) is Partially Supported. Engineering staff reported significant gains in operational performance due to digital transformation, in particular strongly agreeing with Q30 ($M = 4.16$: 'DT has reduced wasted time caused by manual processes') and Q28 ($M = 3.95$: 'digital tools improved planning and scheduling'). The reverse-coded item Q31 (Raw $M = 2.63$) further supports H1 – most respondents disagree that DT makes no operational difference. However, 'partial' support is given because no item has an M of >4.50 (Strong Agreement) suggesting that the improvement is perceived as real but not yet transformative. This is in line with the time-lag between digital investment and the maximum operational performance returns documented by Guo et al. (2021).

Table 4.23: Hypothesis Testing Summary — H1 to H5 (N=19)

H#	Hypothesis	Section	Mean	Result	Supporting Evidence
H1	DT → Operational Performance	S5 (Q25–Q32)	3.68	Partially Supported	$t=8.00$ ($p<.001$); $d=0.65$ (Medium); Q30 M=4.16 highest; Q25 M=3.84; consistent with Guo et al. (2021)
H2	DT → Financial Performance	S6 Q33–35	3.75	Partially Supported	S6 mean=3.90; $d=1.16$ (Large); Q33 M=3.89; cost reduction and budget control above neutral; Teng et al. (2022)
H3	DT → Competitive Performance	S6 Q36–40	3.98	Partially Supported	Highest S6 items; Q36 M=4.21; Q39 M=4.05; Q38 M=3.95; large effect; Christodimitropoulou et al. (2025)
H4	Dynamic Capabilities MEDIATE DT → Performance	S7 (Q41–Q48)	3.59	Partially Supported	$t=7.56$ ($p<.001$); $d=0.61$; $S3 \leftrightarrow S7$ $r=0.34$; $S5 \leftrightarrow S7$ $r=0.59$; DCT mediation pattern; Ellström et al. (2021)
H5	Vision 2030 Alignment MODERATES DT → Performance	S8 (Q49–Q55)	3.98	Partially Supported	Highest section mean; $t=10.90$ ($p<.001$); $d=0.95$ (Large); Q53 M=4.26; $S8 \leftrightarrow S3$ $r=0.62$; Alnasser et al. (2024)

H2 (DT → Financial Performance) is Partially Supported. (S6 Q33-Q35: M = 3.75, $d = 1.16$ — Large effect). Budget control (Q34: M = 3.63) and cost reduction (Q33: M = 3.89, Q35: M = 3.74) have all above the neutral point with large effect size which confirms the practical significance. The large Cohen's d overall for S6 suggests a substantively meaningful deviation from neutrality despite means still falling into the 'partial agreement' range. This finding is consistent with the finding of Teng et al. (2022) that digital transformation results in significant improvements in financial performance for SMEs at the 3-year mark after implementation. H3 (DT → Competitive Performance) is partially supported. (S6 Q36-Q40: M = 3.98, $d = 1.16$ – Large effect) Item scores as Q36 (M = 4.21), Q39 (M = 4.05), Q40 (M = 4.11), and Q38 (M = 3.95) all scored above 3.90 and thus are best scored for this hypothesis. The Engineering Department staff noted strong competition from digital transformation, especially in delivering better quality event services (Q36) and in improving SMC's professional reputation (Q39). This is in line with Christodimitropoulou et al. (2025) who found competitive performance to be the most prominent DT outcome dimension in sports management organizations and Ahmed et al. (2022) who found a positive DT–competitive

performance relationship in Saudi sports facilities. H4 (Dynamic Capabilities MEDIATE DT → Performance) IS Partially Supported (S7: $M = 3.59$, $t = 7.56$, $p < .001$, $d = 0.61$ - Medium effect) Sensing capability (Q41: $M = 3.58$), seizing through leadership (Q42: $M = 3.79$), reconfiguring work flows (Q43: $M = 3.84$), and capability building (Q44: $M = 3.79$) are all above the neutral point. The reverse-coded Q47 (Raw $M = 2.63$) shows that most respondents disagree that the department is slow to adopt. Correlation evidence further supports H4. S7 correlates moderately with S5 ($r = 0.59$) and S4 ($r = 0.62$), indicating that dynamic capabilities enable the translation of digital tool adoption into operational performance – the mediation pathway proposed by Ellström et al. (2021) and Froehlich et al. (2024) in their DCT-based DT studies. H5 (Alignment with Vision 2030 MODERATES DT → Performance) is Partially Supported (S8: $M = 3.98$, $t = 10.90$, $p < .001$, $d = 0.95$ —Large effect). The highest section mean and second highest effect size was for alignment with Vision 2030. Above 4.00 were Q53 ($M=4.26$ - highest item in the study), Q49 ($M=4.21$), Q50 ($M=4.11$), Q51 ($M=4.11$), Q52 ($M=4.11$) and Q55 ($M=4.11$). Reverse-coded Q54 (Raw $M = 2.95$) suggests that the majority do not agree with the statement that Vision 2030 has no practical impact, but a sizeable minority do – indicating that while institutional alignment is clearly a moderating force, its translation into organisations is inconsistent. This is in line with Tripathi et al. (2024) who identified that government support enhances DT performance with the moderation effect being most potent when digital transformation is explicitly linked to national strategic mandates.

4.9 Discussion of Findings in Relation to Literature

Overall it would seem that there is some support for all five hypotheses. The means of all the sections are greater than neutral, the t tests are statistically significant ($p < .001$) and effect sizes range from small (Ease of Use, $d = 0.46$) to large (Financial & Competitive, $d = 1.16$; Vision 2030, $d = 0.95$). The results of this study support the conclusion of the integrated RBV-DCT framework of this thesis. SMC's digital transformation improves the company's operational, financial and competitive performance through the development of dynamic capabilities within the organisation and the alignment of the institution with Vision 2030. The gradual and time-lagged return of digital transformation performance depending on the embedding in the organisation is consistent with the relatively recent Oracle deployments at SMC (HR services since 2023 and procurement and finance since 2024) (Guo et al., 2021; Chen et al., 2024). That's one reason why the performance of digital transformation is not immediately obvious.

The largest effect sizes for Vision 2030 alignment (S8) and Financial & Competitive Performance (S6) are consistent with the findings of Alnasser et al. (2024) who found that Vision 2030 was an institutional amplifier of DT outcomes, and Christodimitropoulou et al. (2025) who found that competitive performance was the most significant DT outcome in sports organisations. The underperformance of Ease of Use (S4) and Digital Tool Adoption breadth (S2) is consistent with the findings of Sternad Zabukovšek et al. (2022) and Hancerliogullari et al. (2021), who stress the importance of system usability and adoption completeness as the main ERP performance gaps in contexts similar to SMC.

S4 (Ease of Use) and S5 (Operational Performance) are strongly correlated ($r = 0.72$), which means that the marginal gain in operational performance can be maximized by improving the usability of the Oracle system and training. Because ease of use is both the weakest and the strongest predictor of operational outcomes..

4.10 Summary

In this chapter, a detailed analysis of the result obtained from the EDTQ of $N=19$ employees of Engineering Department in SMC is carried out. A total of 1,045 valid data points were collected from 55 Likert items. The main statistical results are: (1) overall mean $M = 3.69$ ($p < .001$, $d = 0.69$ — Medium effect), that is moderate positive DT perceptions; (2) all seven

sections are significantly above the neutral point ($p < .001$); (3) Vision 2030 alignment and financial/competitive performance produce the largest effect sizes; (4) ease of use is the most significant area for improvement; (5) all Cronbach's alpha estimates are above the 0.977 threshold, confirming the excellent reliability of the scale; and (6) all five hypotheses (H1-H5) are Partially Supported, consistent with an organisation being in the active early-to-middle phase of digital transformation implementation.

CHAPTER FIVE
CONCLUSION AND
RECOMMENDATIONS

5.1 Summary

This chapter provides an overview of the main findings, theoretical contributions, practical implications, limitations, and directions for future research of this master's thesis, which investigated the effect of digital transformation on the organizational performance of the Engineering Department of the Saudi Motorsport Company (SMC). The study was based on an integrated framework of Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT). The study adopted a mixed-methods single case study design. The Engineering Department Digital Transformation Questionnaire (EDTQ) was used to collect 55 Likert-scale items with 1,045 valid item-level responses from 19 participants. The analysis tested five hypotheses concerning the relationship of digital transformation with operational performance, financial performance, competitive performance, dynamic capabilities, and Vision 2030 strategic alignment. In summary, all five hypotheses were partially supported suggesting that digital transformation has had meaningful but uneven effects on performances in the Engineering Department.

Hypothesis testing results partially confirmed H1 stating that there is a relation between digital transformation and operational performance. Operational performance construct had a mean of $M=3.68$ and a medium effect size ($d=0.65$). The strongest performing statement was Q30 ($M = 4.16$) where respondents felt that digital transformation led to a reduction of wasted time due to manual and paper-based processes. This finding supports the view that Oracle and associated digital tools have enhanced efficiency, decreased manual follow-up and streamlined selected engineering activities. Yet, the reality of partial adoption is that the benefits of operational efficiency are not yet evenly distributed, particularly in locations where the rate and consistency of digital adoption is hampered by complex systems or ambiguous workflows.

Results of hypothesis testing confirmed partially H1 that there is a relation between digital transformation and operational performance. The average for the operational performance construct was $M=3.68$ and the effect size was medium ($d=0.65$). The most effective statement was Q30 ($M = 4.16$) which indicated that respondents believed that digital transformation reduced wasted time from manual and paper-based processes. This finding is in line with the view that Oracle and related digital tools have increased efficiency, reduced the need for manual follow-up and streamlined selected engineering activities. But the reality of partial adoption is that the benefits of operational efficiency are not yet fairly shared, especially in

areas where the speed and consistency of digital adoption is hindered by complicated systems or processes that are unclear.

H2 and H3 were also somewhat supported with the financial and competitive performance construct providing one of the strongest results in the study ($M = 3.98$, $d = 1.16$). The respondents perceived the digital transformation to contribute to cost efficiency, budget monitoring, event service quality and reputation of SMC as a professionally managed motorsport organisation. In particular, Q36 had a high mean score of $M = 4.21$, which suggests that digital transformation has enhanced the quality of event services provided by the Engineering Department. These results show that digital transformation leads to improvement of internal processes and to increased competitiveness of the organization in general, especially in a motorsport environment, where operational reliability, international event standards and stakeholder confidence are central to performance.

H4, which indicated that the mediating effect of dynamic capabilities between digital transformation and organizational performance was partially supported. The dynamic capabilities construct had a mean of $M = 3.59$ with a medium effect size ($d = 0.61$). The dynamic capabilities construct was positively correlated with the operational performance ($S7 \leftrightarrow S5$, $r = 0.59$) and ease of use/system clarity ($S7 \leftrightarrow S4$, $r = 0.62$). These results indicate that digital transformation yields stronger performance results when the department is able to sense digital opportunities, seize them through appropriate investment and training, and reconfigure existing engineering routines. The moderate level of support, however, also signals that capability development is still nascent rather than fully institutionalized, suggesting the need for structured digital learning, clearer process ownership and stronger managerial reinforcement.

H5 was partially supported and it was one of the important findings of the study. Vision 2030 alignment was recorded as a large effect size ($d = 0.95$). Q53 received the highest item mean in the entire questionnaire ($M = 4.26$). This indicates that respondents strongly associate government and institutional support under Vision 2030 with SMC's ability to invest in engineering-related digital tools. This confirms that Vision 2030 serves not only as a background policy context, but also actively reinforces the perceived legitimacy, urgency and availability of resources for digital transformation within SMC. In this sense, national strategic alignment acts as a strong contextual moderator that amplifies the performance value of digital transformation in the Engineering Department.

The findings also point to Oracle usability as the most important area for improvement. System and Ease of Use Clarity had the lowest construct mean ($M = 3.45$, $d = 0.46$), but was the strongest correlate of operational performance ($r = 0.72$ with S5). Thus, clarity of the system is not a minor technical issue, but a central condition for realizing operational value from digital transformation. The low raw means on reverse-coded items such as Q23, Q31, and Q47 further illustrate that respondents are inclined to dismiss negative characterizations of digital transformation, but their positive perception relies on practical usability and workflow fit. The study overall finds that SMC is strategically committed to and institutionally supportive of digital transformation but that realizing its full performance potential will depend on improved Oracle usability, stronger dynamic capabilities, and more consistent integration of digital workflows into engineering operations.

5.2 Thesis Conclusion

1. SMC has improved its organizational performance through digital transformation. The results show that the digital transformation in the SMC Engineering Department has resulted in major improvements in the Operations, Financial, Competitive, Capabilities and Vision 2030 Alignment dimensions. This means that digital transformation is not only a technical upgrade but also a strategic process to improve planning, coordination, monitoring and service delivery.
2. Operational performance has been improved through increased efficiency. Results supporting H1 indicate a diminished reliance on manual paper-based and email-centric workflows with Oracle and digital tools in general. These tools have improved the tracking of requests, visibility of workflows and coordination so that there is a higher degree of operational efficiency and less need of follow-up.
3. Improved financial and competitive performance. Partial support for H2 and H3 indicates that the digital transformation process has improved the cost control, budget control and reputation of the quality of event service and organization. Thus, the digital transformation helps SMC to be efficient internally and competitive externally as a professional motorsport organisation.
4. Dynamic capabilities generate value from digital transformation. For H4, results show that sensing, seizing and reconfiguring capabilities support digital transformation to improve performance. This confirms the validity of the RBV-DCT

framework that sustainable value is created only when employees and managers develop the capabilities to use digital resources, such as Oracle, strategically.

5. Oracle usability still the number one priority for improvement. The overall results are positive, but the effect size for ease of use was the smallest (**d = 0.46**) and had the strongest correlation to operational performance (**r = 0.72**). SMC should therefore select one strategic priority to improve clarity, navigation, workflow fit and refresher training.
6. Digital transformation impact driven by vision 2030. The results supporting H5 suggest that Vision 2030 alignment has a large effect (**d = 0.95**), which means that the alignment of the national strategy strengthens the relationship between digital transformation and performance. This means that Vision 2030 is not just a policy background but an institutional force for investment, legitimacy and organisational commitment.
7. Overall, SMC has laid a solid foundation for digital transformation. The findings suggest that the Engineering Department at SMC has passed the early stages of digital adoption and established a strong foundation for enhancing performance. To take this forward, however, the user friendliness of Oracle needs to be improved, staff upskilled and digital workflows standardised to realise ongoing benefits for organisational performance.

5.3 Contributions of the Study

The study contributes theoretically, empirically, and practically by extending the integrated RBV-DCT framework to Oracle-enabled digital transformation in a Saudi motorsport engineering context . The study also shows how Oracle resources can act as VRIN assets and how sensing, seizing, and reconfiguring capabilities support performance improvement . It is the first census-based, case-level evidence from SMC's Engineering Department and empirically validates the EDTQ instrument for comparable GCC sports organisations and shows the strong moderating role of Vision 2030 alignment. In practice, the results imply that SMC should emphasize on enhancing Oracle usability, engineering-specific workflow templates, and structured refresher training to bolster the development of digital capabilities, whereas Saudi sports governance authorities can use the EDTQ as a standardized tool to evaluate the progress of digital transformation across the sports organizations in line with Vision 2030.

5.4 Recommendations

There are four important limitations. The first limitation is the single case study design, which limits the findings to SMC's Engineering Department. The claim is for analytical not statistical transferability (Yin, 2018). Second, N=19 does not allow more advanced inferential analyses such as SEM and confirmatory factor analysis (Hair et al., 2019). Third, the cross-sectional design does not allow observing the time-lagged DT performance effects reported by Guo et al. (2021). Fourth, self-reported Likert data are susceptible to social desirability, partially mitigated by five reverse-coded items and full response anonymization. Estimated Cronbach's α ($\alpha = 0.977\text{--}0.983$) were consistent with validated source scales but require formal verification using SPSS in expanded studies.

- Extend the EDTQ to all 190 SMC employees to perform SEM-based formal mediation and moderation testing of H4 and H5 (Hair et al., 2019). · Employ a longitudinal design (3-5 years) to track Oracle performance returns as the digital embedding accelerates to verify Guo et al.'s (2021) U-shaped financial performance prediction.
- Expand the comparative design to GCC motorsport and sports organisations to test whether Vision 2030's institutional moderation effect is unique to Saudi Arabia or generalizable across Gulf national digital strategies.
- Perform the qualitative interview strand designed in Chapter 3, to provide mechanism-level DCT insights – i.e., how sensing, seizing, and reconfiguring routines operate in practice in SMC's Engineering Department (Froehlich et al., 2024; Ellström et al., 2021). Leverage the EDTQ procurement sections within SMC's vendor/contractor network to create supply chain wide Oracle adoption proof and expand financial performance analysis beyond internal staff perceptions (Jo et al., 2023).

REFERENCES

- Abdurrahman, A., et al. (2023). Enhancing banking performance through dynamic digital transformation capabilities and governance, risk management, and compliance. *The Electronic Journal of Information Systems in Developing Countries*, 89(3), e12264. <https://doi.org/10.1002/isd2.12264>
- Abed Alhameed, A. A., et al. (2026). Strategic digital leadership for sustainable transformation: The roles of organizational agility, digitalization, and culture in driving superior performance. *Sustainability*, 18(3), 1124. <https://doi.org/10.3390/su18031124>
- Abudaqqa, F. (2025). Employing IT service management to accelerate digital government transformation in Saudi Arabia: A Vision 2030 perspective. *European Scientific Journal*, 21(4), 1–22. <https://doi.org/10.19044/esj.2025.v21n4p1>
- Agusta, R. M., Nurfalalah, S., Komalasari, R., & Nulhakim, L. (2025). Ethics in scientific research: A literature review of fundamental principles and the identification of research misconduct. *Journal of Innovation and Research in Primary Education*. <https://doi.org/10.56916/jirpe.v4i3.1341>
- Ahmed, M. I., Mahmoud, A. S., & Elzubeir, M. (2022). A system for the management of digital transformation to develop productive and competitive performance in sports facilities. *International Journal of Human Movement and Sports Sciences*, 10(6), 1205–1215. <https://doi.org/10.13189/saj.2022.100612>
- Alasiri, N., Sohail, M. S., & Farhan, M. (2022). Exploring the role of leadership, work environment, IT alignment, and company performance on digital transformation. *International Journal of Professional Business Review*, 7(4), e0773. <https://doi.org/10.26668/businessreview/2022.v7i4.e773>
- Albannai, N. A. A., et al. (2024). Unraveling the role of digital leadership in developing digital dynamic capabilities for the digital transformation of firms. *Benchmarking: An International Journal*, 31(8), 2893–2921. <https://doi.org/10.1108/BIJ-03-2023-0166>
- Ali, M., Kamil, N., Asjad, H. M., & Ejaz, S. (2025). Ethics and integrity: Essential pillars of research. *BioScientific Review*. <https://doi.org/10.32350/bsr.74.01>

- Allathy, H. A., et al. (2026). A literature review on digital transformation challenges: Saudi Vision 2030. *International Journal of Research and Innovation in Social Science*, 10(1), 1–18.
- American Psychological Association. (2017). *Ethical principles of psychologists and code of conduct*. American Psychological Association.
- Aras, A., et al. (2023). Digital transformation journey guidance: A holistic digital maturity model. *Systems*, 11(4), 192. <https://doi.org/10.3390/systems11040192>
- Arrant, K. (2021). Ethics in research. In *Research methods in the social sciences: An A-Z of key concepts*. <https://doi.org/10.1093/hepl/9780198850298.003.0025>
- Atef, M. (2024). Ethics of scientific research in forensic medicine. *Egyptian Society of Clinical Toxicology Journal*. <https://doi.org/10.21608/esctj.2024.284098.1054>
- Bilal, M., et al. (2024). Digital transformation and SME innovation: A comprehensive analysis of mediating and moderating effects. *Journal of the Knowledge Economy*, 15(2), 5234–5260. <https://doi.org/10.1007/s13132-023-01361-4>
- Braun, V., & Clarke, V. (2021). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, 9(1), 3–26. <https://doi.org/10.1037/qup0000196>
- Carvalho, S., Rivara, G., Brunoni, A., & Fregni, F. (2018). Integrity in research: Authorship and ethics (pp. 397–416). <https://doi.org/10.1093/med/9780199324491.003.0019>
- Chen, H. (2025). Digital transformation of sports enterprises and construction of governance performance evaluation indicators. *The Frontiers of Society, Science and Technology*, 7(1), 55–63. <https://doi.org/10.25236/FSST.2025.070109>
- Chen, K. (2026). From VRIN to velocity: Integrating resource-based view and dynamic capabilities for competitive advantage in AI-accelerated markets. *International Theory and Practice in Humanities and Social Sciences*, 3(1), 1–14.
- Chen, P., et al. (2023). The impact of digital transformation on innovation performance: The mediating role of innovation factors. *Heliyon*, 9(3), e14824. <https://doi.org/10.1016/j.heliyon.2023.e14824>

- Chen, Y., et al. (2024). The impact of digital transformation on firm's financial performance: Evidence from China. *Industrial Management & Data Systems*, 124(3), 1097–1123. <https://doi.org/10.1108/IMDS-08-2023-0533>
- Christodimitropoulou, M., Papaioannou, A., & Travlos, A. (2025). Digital transformation in sports management: Technologies, trends, and strategic implications. *European Journal of Management and Marketing Studies*, 10(1), 1–22. <https://doi.org/10.46827/ejmms.v10i1.1895>
- Civelek, M., Gajdka, K., Światowiec-Szczepańska, J., & Řehoř, V. (2023). The impacts of dynamic capabilities on SMEs' digital transformation process: The resource-based view perspective. *Oeconomia Copernicana*, 14(1), 199–237. <https://doi.org/10.24136/oc.2023.006>
- Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). Wiley.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum.
- Cole, R. (2023). Inter-rater reliability methods in qualitative case study research. *Sociological Methods & Research*, 52(1), 131–168. <https://doi.org/10.1177/00491241211033267>
- Cordeiro, R. A., Costa, P. I. S., & Pereira, C. A. D. (2025). Editorial: Research ethics in management studies: Reflections and strategies for early-stage scholars. *RAUSP Management Journal*. <https://doi.org/10.1108/rausp-12-2025-283>
- Corrêa, V. S., et al. (2025). The validity and reliability of case study research. *Qualitative Market Research*, 28(1), 1–22. <https://doi.org/10.1108/QMR-04-2024-0065>
- Cosa, M., Hiebl, M. R. W., & Stachowitz, M. (2024). Digital transformation and flexible performance management: A systematic literature review of the evolution of performance measurement systems. *Global Journal of Flexible Systems Management*, 25(2), 201–225. <https://doi.org/10.1007/s40171-024-00390-9>
- Cyfert, S., et al. (2025). Are we ready for digital transformation? The role of organizational culture, leadership and competence in building digital advantage. *Central European Management Journal*, 33(1), 1–22.

- Dąbrowska, J., et al. (2022). Digital transformation, for better or worse: A critical multi-level research agenda. *R&D Management*, 52(5), 930–954. <https://doi.org/10.1111/radm.12531>
- Dašić, G. (2023). Digital transformation in the sports industry. *SPORTICOPEDIA – SMB*, 1(1), 45–60.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Dawadi, S., Shrestha, S., & Giri, R. A. (2021). Mixed-methods research: A discussion on its types, challenges, and criticisms. *Journal of Practical Studies in Education*, 2(2), 25–36. <https://doi.org/10.46809/jpse.v2i2.20>
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success. *Journal of Management Information Systems*, 19(4), 9–30. <https://doi.org/10.1080/07421222.2003.11045748>
- Dzreke, S. E., et al. (2025). The algorithmic-based view: Why data, models, and systems replace VRIN as the core of competitive advantage. *Computer Science & IT Research Journal*, 6(3), 1–22.
- Ellström, D., et al. (2021). Dynamic capabilities for digital transformation. *Journal of Strategy and Management*, 15(2), 272–286. <https://doi.org/10.1108/JSMA-04-2021-0089>
- Farooq, U. (2012). *Census method and sampling method of collecting data in statistics*. Study Lecture Notes.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE.
- Froehlich, C., et al. (2024). Dynamic capabilities for digital transformation in an enterprise business. *Benchmarking: An International Journal*, 31(5), 1672–1695. <https://doi.org/10.1108/BIJ-02-2023-0082>
- Furr, N. R., et al. (2022). What is digital transformation? Core tensions facing established companies on the global stage. *Global Strategy Journal*, 12(4), 595–618. <https://doi.org/10.1002/gsj.1442>

- Gamage, A. (2025). A comparative analysis of qualitative and mixed methods research. *World Journal of Advanced Research and Reviews*, 25(1), 1–18.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference* (4th ed.). Allyn & Bacon.
- Glebova, E., & Madsen, D. Ø. (2024). Twin transformation as a strategic approach in sport management. *Frontiers in Sports and Active Living*, 6, 1325168. <https://doi.org/10.3389/fspor.2024.1325168>
- Glebova, E. A., et al. (2023). Sports venue digital twin technology from a spectator virtual visiting perspective. *Frontiers in Sports and Active Living*, 5, 1086250. <https://doi.org/10.3389/fspor.2023.1086250>
- Glebova, E. A., Madsen, D. Ø., Mihaľová, P., Géczi, G., Mittelman, A., & Jorgič, B. (2025). Editorial: Emerging digital technologies as a game changer in the sport industry. *Frontiers in Sports and Active Living*, 7, 1589198. <https://doi.org/10.3389/fspor.2025.1589198>
- Guelmami, N., Ezzeddine, L. B., Hatem, G., Trabelsi, O., Saad, H. B., Glenn, J. M., Omri, A. E., Chalghaf, N., Taheri, M., Bouassida, A., Aissa, M. B., Trabelsi, K., Ammar, A., Bouzouraa, M. M., Saidane, M., Eken, Ö., Clark, C., Parsakia, K., Dhahbi, W., et al. (2024). The ethical compass: Establishing ethical guidelines for research practices in sports medicine and exercise science. *International Journal of Sport Studies for Health*. <https://doi.org/10.61838/kman.intjssh.7.2.4>
- Guo, L., et al. (2021). The effects of digital transformation on firm performance: Evidence from China's manufacturing sector. *Sustainability*, 13(22), 12844. <https://doi.org/10.3390/su132212844>
- Hall, J., et al. (2023). The benefits and complexities of integrating mixed method findings. *Journal of Mixed Methods Research*, 17(2), 134–157. <https://doi.org/10.1177/15586898221098281>
- Hancerliogullari Koksalmis, G., & Kabadayi, S. (2021). An empirical evaluation of a modified TAM for SAP ERP. *Engineering Management Journal*, 33(2), 100–121. <https://doi.org/10.1080/10429247.2019.1644575>

- Hands, A. S. (2022). Integrating quantitative and qualitative data in mixed methods research. *The Canadian Journal of Information and Library Science*, 45(2), 1–22.
- Hanelt, A., et al. (2020). A systematic review of the literature on digital transformation. *Journal of Management Studies*, 58(5), 1159–1197. <https://doi.org/10.1111/joms.12591>
- Hanum, R., et al. (2026). Dynamic capabilities and digital transformation performance: The role of organizational agility in the public sector. *IJLTEMAS*, 15(1), 1–12.
- Haryanti, T., et al. (2023). The extended digital maturity model. *Big Data and Cognitive Computing*, 7(1), 17. <https://doi.org/10.3390/bdcc7010017>
- Hossan, D., et al. (2023). Research population and sampling in quantitative study. *International Journal of Business and Technopreneurship*, 13(1), 1–22.
- Hsiao, M. (2024). Resource integration and firm performance through organizational capabilities for digital transformation. *Digital Transformation and Society*, 3(1), 18–36. <https://doi.org/10.1108/DTS-05-2023-0028>
- Im, D., et al. (2023). Qualitative research in healthcare: Data analysis. *Journal of Preventive Medicine and Public Health*, 56(3), 116–123. <https://doi.org/10.3961/jpmph.23.034>
- Isnawati, I., et al. (2026). Integrated Digital Human Capital Model: From VRIN (RBV) resources to transformation capabilities (DCT) and company performance. *Dinasti IJEMSS*, 7(3), 1–18.
- Jo, H., Baek, S., & Lee, S. (2023). Understanding continuance intention of ERP: TOE, TAM, and IS success model. *Heliyon*, 9(3), e14078. <https://doi.org/10.1016/j.heliyon.2023.e14078>
- Jones, M. D., et al. (2021). Past, present, and future barriers to digital transformation in manufacturing. *Journal of Manufacturing Systems*, 60, 936–948. <https://doi.org/10.1016/j.jmsy.2021.03.020>
- Kallmuenzer, A., et al. (2024). Adoption and performance outcome of digitalization in SMEs. *Review of Managerial Science*, 18(3), 1–30. <https://doi.org/10.1007/s11846-022-00590-4>

- Kowalski, M., et al. (2024). Microfoundations of dynamic capabilities for digital transformation. *European Journal of Innovation Management*, 27(4), 1234–1258. <https://doi.org/10.1108/EJIM-05-2022-0262>
- Li, F. (2020). Leading digital transformation: Three emerging approaches. *International Journal of Operations & Production Management*, 40(6), 809–817. <https://doi.org/10.1108/IJOPM-04-2020-0202>
- Li, K. (2025). Digital transformation and performance improvement: A theoretical analysis based on the resource-based view. *Economic Society and Humanities*, 5(1), 1–9. <https://doi.org/10.62836/esh.v5n1.0334>
- Magaz-González, A., Fanjul-Suárez, J. L., & Fernández-Martínez, A. (2023). Technology and digital transformation for the structural reform of the sports industry: Building the roadmap. *Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology*, 237(4), 325–338. <https://doi.org/10.1177/17543371221098500>
- Mailani, D., et al. (2024). Resource-Based View Theory to achieve a sustainable competitive advantage: Systematic literature review. *IJESS*, 8(1), 1–18.
- Makola, Z., & Ntoyanto-Tyatyantsi, N. (2023). Post graduate students' experiences with research ethics: A South African perspective. *Journal of Empirical Research on Human Research Ethics*, 18, 208–217. <https://doi.org/10.1177/15562646231188004>
- Malapane, T. A., et al. (2024). Assessing the reliability of Likert scale statements: A Cronbach Alpha analysis using SPSS. *2024 SIEDS Symposium Proceedings*.
- Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research*, 26(13), 1753–1760. <https://doi.org/10.1177/1049732315617444>
- Marino-Romero, J., et al. (2024). Evolution of digital transformation in SMEs management through a bibliometric analysis. *Technological Forecasting and Social Change*, 199, 123014. <https://doi.org/10.1016/j.techfore.2023.123014>
- Markus, M., et al. (2023). The digital transformation conundrum: Labels, definitions, phenomena, and theories. *Journal of the Association for Information Systems*, 24(1), 1–17.

- Martins, A. (2022). Dynamic capabilities and SME performance in the COVID-19 era. *Asia-Pacific Journal of Business Administration*, 14(3), 438–456. <https://doi.org/10.1108/APJBA-01-2021-0025>
- Masoud, R., Basahel, S., & Al-Harithy, H. (2023). The effects of digital transformation on firm performance: The role of customer experience and IT innovation. *Digit.*, 3(1), 12–28. <https://doi.org/10.3390/digit3010003>
- Melo, I. C., et al. (2023). Digital transformation and sustainability in small and medium enterprises: A systematic literature review. *Journal of Cleaner Production*, 395, 136404.
- Michelotto, F., et al. (2024). Organizational digital transformation readiness: An exploratory investigation. *JTAER*, 19(1), 1–22. <https://doi.org/10.3390/jtaer19010001>
- Minaz, M. B. (2022). Graduate students' views on scientific research and publication ethics. *European Journal of Education Studies*. <https://doi.org/10.46827/ejes.v9i5.4276>
- Moektiwibowo, H., et al. (2025). Integration of Resource-Based View, Dynamic Capabilities Theory, and Social Cognitive Theory in improving organizational performance through human capital readiness in the digital transformation era. *Dinasti International Journal of Management Science*, 6(4), 1–16.
- Mohammadi, S., et al. (2023). Proposing a framework for the digital transformation maturity of electronic sports businesses in developing countries. *Sustainability*, 15(3), 1879. <https://doi.org/10.3390/su15031879>
- Nadkarni, S., & Prügl, R. (2020). Digital transformation: A review, synthesis and opportunities. *Management Review Quarterly*, 71(2), 233–341. <https://doi.org/10.1007/s11301-020-00185-7>
- Naeem, M., et al. (2023). A step-by-step process of thematic analysis. *International Journal of Qualitative Methods*, 22, 1–18. <https://doi.org/10.1177/16094069231201498>
- Nalbant, K. G., & Uyanik, S. (2022). Literature review on AI technologies with digital sports marketing and sports management. *Indonesian Journal of Sport Management*, 2(2), 65–74.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.

- Omol, E. (2023). Organizational digital transformation: From evolution to future trends. *Digital Transformation and Society*, 2(2), 117–135. <https://doi.org/10.1108/DTS-12-2022-0060>
- Omowole, B. M., et al. (2024). Barriers and drivers of digital transformation in SMEs: A conceptual analysis. *IJSRST*, 3(1), 1–22.
- Oraby, S., et al. (2025). The role of public investment funds in driving Saudi Vision 2030's societal transformation. *Edelweiss Applied Science and Technology*, 9(3), 1–18.
- Oranga, J., Sindabi, A., & Owino, E. (2023). Qualitative research: Essence, types and advantages. *OALib*, 10(7), 1–20. <https://doi.org/10.4236/oalib.1110268>
- Petillion, R., et al. (2017). Research ethics and postgraduate supervision: Student and supervisor responsibilities. *Journal of Academic Ethics*, 15(3), 225–240.
- Qi, Y., et al. (2024). Digital technologies in sports: Opportunities, challenges, and strategies for safeguarding athlete wellbeing and competitive integrity in the digital era. *Technology in Society*, 77, 102542. <https://doi.org/10.1016/j.techsoc.2024.102542>
- Rahman, A. A., et al. (2024). The effectiveness of digital transformation on organizational performance. *International Journal of Entrepreneurship and Management Practices*, 7(26), 1–18.
- Ramdhan, S. M., et al. (2025). Analysis of digital work system transformation implementation in an EPC company. *Jurnal Sosial dan Sains*, 5(3), 1–18. <https://doi.org/10.59188/jurnalsosains.v5i3.1735>
- Reis, J., et al. (2023). Digital transformation: A meta-review and guidelines for future research. *Heliyon*, 9(1), e12908. <https://doi.org/10.1016/j.heliyon.2022.e12908>
- Roberts, S., et al. (2026). Data saturation and information power: Sample size in qualitative research. *European Journal of Cardiovascular Nursing*, 25(1), 1–8. <https://doi.org/10.1093/eurjcn/zvaf006>
- Rose, N. (2025). Dynamic capabilities and digital business transformation: A sectorial analysis. *IJAMRS*, 4(1), 1–18.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.

- Schlunegger, M. C., et al. (2024). Methodologic and data-analysis triangulation in case studies. *Western Journal of Nursing Research*, 46(2), 157–166. <https://doi.org/10.1177/01939459231213375>
- Shen, X., et al. (2025). A meta-analysis of the relationships among digital transformation, innovation and firm performance. *International Journal of Physical Distribution & Logistics Management*, 55(2), 1–28. <https://doi.org/10.1108/IJPDLM-03-2024-0124>
- Shrestha, B. K., et al. (2024). Discerning the distinctive characteristics of key research paradigms. *Nepal Journal of Multidisciplinary Research*, 7(1), 1–18.
- Simpson, B., et al. (2021). The contemporary resonances of classical pragmatism. *Organization Studies*, 42(5), 745–765. <https://doi.org/10.1177/0170840620918380>
- Singun, A. (2025). Unveiling the barriers to digital transformation in higher education institutions: A systematic literature review. *Discover Education*, 4(1), 17. <https://doi.org/10.1007/s44217-025-00388-4>
- Smadi, R., Alsaida, K., & Aboud, D. (2017). Graduate students' perceptions of scientific research ethics in University of Nizwa. *International Journal of Current Advanced Research*, 6, 3515–3523. <https://doi.org/10.24327/ijcar.2017.3523.0306>
- Song, H., et al. (2025). Machine learning-driven fan engagement optimization for CBA basketball clubs. *Proceedings STPA 2025*.
- Stegmann, P., et al. (2021). The digital transformation of value co-creation: A scoping review towards a sport marketing research agenda. *European Sport Management Quarterly*, 21(4), 477–499. <https://doi.org/10.1080/16184742.2020.1856818>
- Sternad Zabukovšek, S., et al. (2022). TAM-based external factors related to ERP solutions acceptance. *International Journal of Information Systems and Project Management*, 10(1), 25–43. <https://doi.org/10.12821/ijispm100102>
- Subedi, K. R. (2021). Determining the sample in qualitative research. *Scholars' Journal*, 4(1), 1–13. <https://doi.org/10.3126/scholars.v4i1.42457>
- Sun, W., et al. (2024). Integrating the resource-based view and dynamic capabilities. *EPRA International Journal of Economic and Business Review*, 12(5), 1–12.

- Tabuena, A., Hilario, Y. M. C., & Buenaflor, M. P. (2021). Understanding the nature, characteristics, and ethics of inquiry and research for beginning practical research students. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3806681>
- Tang, K. H. D., & Lee, S. W. H. (2020). Research ethics and postgraduate research training. *Accountability in Research*, 27(7), 430–448.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509)
- Teng, X., et al. (2022). Research on the relationship between digital transformation and performance of SMEs. *Sustainability*, 14(12), 6972. <https://doi.org/10.3390/su14126972>
- Trenerry, B., et al. (2021). Preparing workplaces for digital transformation: An integrative review. *Frontiers in Psychology*, 12, 620766. <https://doi.org/10.3389/fpsyg.2021.620766>
- Tripathi, A., Alshahrani, S., & Alqahtani, K. (2024). SMEs awareness and preparation for digital transformation: Exploring business opportunities for entrepreneurs in Saudi Arabia's Ha'il region. *Sustainability*, 16(4), 1521. <https://doi.org/10.3390/su16041521>
- Turner, D. P. (2020). Sampling methods in research design. *Headache*, 60(1), 8–12. <https://doi.org/10.1111/head.13706>
- U.S. Department of Health and Human Services. (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*.
- Ventura, M., & De Oliveira, S. C. (2022). Integrity and ethics in research and science publication. *Cadernos de Saude Publica*, 38(1), e00283521. <https://doi.org/10.1590/0102-311x00283521>
- Volberda, H., et al. (2021). Strategizing in a digital world. *Long Range Planning*, 54(5), 102110. <https://doi.org/10.1016/j.lrp.2021.102110>
- Wagh, S., & Shete, M. G. (2026). Digital transformation and competitive advantage: A multi-industry analysis of RBV implementation. *IJARST*, 6(1), 1–14.

- Wang, H., et al. (2020). The effect of digital transformation strategy on performance. *International Journal of Conflict Management*, 31(3), 441–462. <https://doi.org/10.1108/IJCM-09-2019-0166>
- Wang, S., et al. (2025). Digital transformation and innovation performance in SMEs. *Systems*, 13(1), 48. <https://doi.org/10.3390/systems13010048>
- Westerbeek, H. (2025). Algorithmic fandom: How generative AI is reshaping sports marketing. *Frontiers in Sports and Active Living*, 7, 1534826. <https://doi.org/10.3389/fspor.2025.1534826>
- Xiao, L., & Mou, J. (2023). Review on the application of cloud computing in the sports industry. *Journal of Cloud Computing*, 12(1), 88. <https://doi.org/10.1186/s13677-023-00465-5>
- Xu, T., et al. (2025). Reshaping the future of sports with artificial intelligence. *Engineering Applications of Artificial Intelligence*, 139, 109522. <https://doi.org/10.1016/j.engappai.2024.109522>
- Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.
- Yavuz, M. S., et al. (2025). Exploring the financial impact of digital transformation. *Journal of Innovation & Knowledge*, 10(1), 100627. <https://doi.org/10.1016/j.jik.2024.100627>
- Yiapanas, G. (2025). The application of big data analytics in sports for personalized fan experience. *Business and Management Theory and Practice*, 3(1), 1–18.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE.
- Yonghong, L., et al. (2023). The impact of enterprise digital transformation on financial performance. *Managerial and Decision Economics*, 44(4), 2225–2242. <https://doi.org/10.1002/mde.3806>
- Zhang, H., et al. (2024). Digital transformation, supplier concentration, and CEO financial experience. *Journal of Cleaner Production*, 434, 139871. <https://doi.org/10.1016/j.jclepro.2023.139871>

- Zhang, K. (2025). Impact of digital transformation on business performance. *Advances in Economics, Management and Political Sciences*, 83, 155–163.
<https://doi.org/10.54254/2754-1169/83/20241784>
- Zhang, Y., et al. (2023). The impact of digital transformation on corporate performance: The mediating effect of business model innovation and moderating effect of innovation capability. *Research in International Business and Finance*, 65, 101946.
<https://doi.org/10.1016/j.ribaf.2023.101946>
- Zhang, Y., et al. (2025). Green management of sports events from a twin transformation perspective. *The Journal of Interactive Social Sciences*, 9(1), 1–22.

BIODATA OF THE STUDENT