

Supply Chain Management Practices and Supply Chain Performance Effectiveness

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1. Chapter 1: Introduction

Introduction:

Over the past two decades, supply chain management (SCM), emphasizing the interdependence of buyer and supplier firms working collaboratively to improve the performance of the entire supply has generated extensive interest in both academic and practitioner communities Shin and Collier others (2000).

Supply chain management is an integrated approach beginning with planning and control of materials, logistics, services, and information stream from suppliers to manufacturers or service providers to the end client; it represents a most important change in business management practices (Fantazy and Kumar Others 2010). It is one of the most effective ways for firms to improve their performance (Ou And Liu Other 2010).

SCM includes a set of approaches and practices to effectively integrate suppliers, manufacturers, distributors and customers for improving the long-term performance of the individual firms and the supply chain as a whole in a cohesive and high-performing business model Chopra S, Meindl P (2001).

A successful SCM implementation is expected to enhance the relationship between upstream suppliers and downstream customers, and thereby increase customer satisfaction and firm performance. Prior research has indicated SCM as a key driver of firm performance (Wisner and Leong 2005).

Everyone agrees that effective supply chain management can provide a major source of competitive advantage. The goal of a supply chain manager must therefore be to link the end customers, the channels of distribution, the production processes and the procurement activity in such a way that customers' service expectations are exceeded and yet at a lower total cost than the competition Many SCM studies were conducted in developed countries.

Furthermore most of the previous research focuses on the relationship between supply chain management practices and organizational performance Yap Lang Ling, Cheng Ling Tan (2012). in the other side the supply chain of performance there

are some studies focused on measuring supply chain performance, such as Performance metrics in supply chain management by (Bhagwat Rajat, Milind Kumar Sharma2007). Specifically in the supply chain performance effectiveness. There are very few studies

Despite the importance of supply chain practices on supply chain performance there is a lack on studies that link supply chain management practices and supply chain performance effectiveness this study seeking to contribute in filling this gap, SCMP in many developing countries is different from SCMP in developed countries. This study mainly focuses on manufacturing companies. Due to the lack of studies this study aims empirically test the relationships between SCM practices and supply chain performance effectiveness of manufacturing companies.

Globalization and intensive world-wide competition along with the technological advancements create an entirely new business environment for the manufacturing organizations. Initially, manufacturing companies have accomplished massive productivity gains through the implementation of lean production in response to this intensifying competition. The “waste” has eliminated from many different local operations for the sake of better productivity. Currently such type of massive productivity improvements for many manufacturing organizations is very limited. Instead, there is a huge improvement potential to reduce the inefficiencies caused by the poor performance of the suppliers, unpredictable customer demands, and uncertain

business environment. An integrated supply chain has a clear advantage on the competitiveness of the individual companies. As a result, the chain-chain competition has started to take over the enterprise-enterprise competition, although many enterprise-enterprise competitions do exist particularly in the less developed economies (Koh *et al.*, 2006). The forward-looking enterprises today are dynamic; they collaborate with suppliers, customers and even with competitors; share information and knowledge aiming to create a collaborative supply chain that is capable of competing if not leading the particular industry. Hence, gaining competitive edge under such a cut-throat environment becomes increasingly difficult, if not impossible.

The supply chain concept is theorized from the formation of a value chain network consisting of individual functional entities committed to providing resources and information to achieve the objectives of efficient management of suppliers as well as the flow of parts (Lau and Lee, 2000). Supply chain management (SCM) includes a set of approaches and practices to effectively integrate suppliers, manufacturers, distributors and customers for improving the long-term performance of the individual firms and the supply chain as a whole in a cohesive and high-performing business model (Chopra and Meindl, 2001). As defined by the Council of Supply Chain Management Professionals (CSCMP), SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities as well as coordination and collaboration with channel partners.

SCM and related strategies are crucially important to the success of a manufacturing firm. This is because the cost and quality of goods and services sold are directly related to the cost and quality of goods and services purchased. Therefore, supply chain policies such as procurement and supplier selection have an important role in the SCM (Hartley and Choi, 1996; Degraeve *et al.*, 2000). Lean practices to improve the internal processes of an organization in line with the principles of just in time (JIT) supply are other highly recognized practices in SCM (Burgess *et al.*, 2006; Cigolini *et al.*, 2004). Integration of internal processes of the organization with the suppliers and customers forms the essence of the whole idea behind SCM. With the widespread use of internet, web-based systems enable organizations to form strong customer and supplier integration for inventory management, demand forecasting, customer and supplier relationship management (Frohlich and Westbrook, 2002).

The importance of better tracking of products logistics, improved efficiency in information processing, improved security, reduced counterfeit, fast-tracked quotation and ordering, improved customer relationships, better control of supplies on the SCM performance has been repeatedly reported by the cases such as Frankfurt Airport in Germany and Wal-Mart in the USA, even though these cases often are from more developed countries where appropriate infrastructure is in place. In all of these efforts, strategic planning for the manufacturing organizations has an integral role.

Regarding the implementation of SCM practices by manufacturing firms in Turkey, Ulusoy (2002, 2003) provides an excellent overview of the manufacturing firms with special emphasis on machinery and equipment industry. Predominantly, Turkish manufacturing industry relies on low cost strategy with respect to supply (Ulusoy, 2003) and uses “low cost” as a main supplier selection criterion in machinery and equipment industry (Ulusoy, 2002). This is not particularly surprising as far as the share of material costs within the total manufacturing costs are concerned (ranging from 56 per cent in machinery and equipment to 87 per cent in automotive). Quality appears to be order qualifier where the price is order-winner from the suppliers’

perspective (Ulusoy, 2003).

The purpose of this study is to determine the underlying dimensions of SCM practices and to empirically test a framework identifying the relationships among SCM practices, operational performance and SCM-related organizational performance with special emphasis on small and medium size enterprises (SMEs) in Turkey.

Although the needs and operating environment of SMEs are very different from those of large firms, there is a dearth of literature regarding the use of SCM practices and its effect on performance of SMEs in emerging market economies such as Turkey. SMEs have significant impacts on supply chain performance, where they may serve the roles of suppliers, distributors, producers and customers (Hong and Jeong, 2006). In several emerging countries, SMEs form the largest group of manufacturing firms which essentially provide specialty manufacturing and support services to large firms (Huin *et al.*, 2002). SMEs also play a very crucial role to the economies of most emerging nations from the viewpoint of generating employment and economic growth. They account for more than half of the employment and added value in most countries (UNCTAD, 1993). Similar trend is also observed in Turkey where SMEs constitute 99.5 per cent of all business establishments and employ 61.1 per cent of the workforce (Yilmaz, 2004). In view of the fact that the success of small business has a direct impact on the national economy, this paper seeks to add to the body of knowledge by providing new data and empirical insights into the relationship between SCM practices and performance of SMEs operating in Turkey.

The remainder of this paper is organized as follows. The next section presents the literature review that helps to underpin the research framework and sets out the study's hypotheses. The research methodology is presented in the third section. Results and discussion are in section four followed by conclusion and implications.

1.1. Research Background

1.2. Research Problem

Concept of the Supply Chain

The definition of supply chain management Is the integration of business processes from end user through original supplies that provides products, services, and information that add value to customers Galaskiewicz Joseph (2011) "supply chain" seems to be common across authors than the definition of "supply chain management". (Lalonde BJ 1998). and Masters proposed that a supply chain is a set of firms that pass materials forward. Normally several independent firms are involved in manufacturing a product and placing it in the hands of the end user in a supply chain –raw material and component producers, product assemblers wholesalers, retailer merchants, and transportation companies are all members of a supply chain (Lalonde BJ 1998).

Theoretical Gaps

Supply chain management practices (SCM P)

The practice of SCM refers to complete set of actions which are done in organizations towards to improve the effectiveness in the internal supply chain. The modern evaluation of the SCM practices that comprise of partnership with the supplier, process of outsourcing, compression of cycle time, continuousness of process flow and sharing of technology and information Tan, K. C., Kannan, V. R., & Handfield, R. B. (1998). by using purchasing the quality and relations with the customer SCM practices are defined as a set of activities undertaken in an organization to promote effective management of its supply chain Suhong Lia, Bhanu Ragu-Nathanb, and other(2006). Supply base management refers to how firms utilize their supplier's processes, technology, and capabilities

to enhance supply chain performance and competitive advantage and how the manufacturing, logistics, materials, distribution and transportation functions are coordinated within organizations Billington, C., Lee H.L. and (1992), also Mentzer, JT (2001), state that SCM in practice means includes the involved companies planning and strategy for coordination of their supply chain, including collaboration between functions internally as well as across company. SCM practices are defined also as approaches applied in managing integration and coordination of supply, demand and relationships in order to satisfy consumers in effective and profitable manners. A recent study found that firms often use supplier evaluation or performance measurement to identify specific supplier deficiencies and to develop plans to address them Krause, D.R. and T.V. Scannell(2002). Such efforts may involve the measurement of supplier's delivery, quality, and cost performance, site visits, certification of supplier's products and processes, and the setting of performance goals.

1.2.1. Practical Gaps

The Dimensions of Supply Chain Management Practices Many authors studied supply chain management practices and there are various elements and dimensions that have measured or used to measure the supply chain practice, for more exploration in the following

1. Chin et al. (2011) information sharing, customer relationship, strategic supplier partnership, material flow management and corporate culture.
2. Inda , et al (2012) Strategic supplier partnership, customer relationship, information sharing
3. Chowa , et al (2008) There are four elements (suppliers and customer mgt, information sharing, speed of communication, supply chain features)

4. Min & Mentzer(2004) There are seven elements of supply chain practice such as agreed vision and goals, information sharing, risk and award sharing, cooperation, process integration, a long-term relationship, and a greedy supply chain leadership.
5. Chen & Paulraj (2004) Using supplier base reduction, long-term relationship, communication, cross-functional teams, and supplier involvement to measure buyer-supplier relationships
6. Tan, Lyman, and Wisner,(2002) Six elements of supply chain practice (using factor analysis) supply chain integration, information sharing supply chain characteristics customer service management, geographical proximity, and JIT capability
7. Alvarado & Kotzab,(2001) Using inter-organizational systems in supply chain practice such as EDI, and elimination of excess stock levels by postponing customization toward the end of the supply chain
8. Tan, Kannan, and Handfield (1998) Supply chain practice includes purchasing quality, and customer relations
9. Donlon (1996, 117, October, pp.54–63) Supply chain practice includes supplier partnership, outsourcing cycle time compression, continuous process flow, and information sharing.

1.3. Research Significance

Supply chain performance effectiveness helps to provide many direct and indirect benefits for suppliers and manufacturing companies where it represents the ability to invent and produce solutions that add more value to (customers) than existing offers, also effectiveness adds great important for both manufacturing companies , supplier network and other parties, By using Resources based view theory the study aims to identify the effects of different dimensions of supply chain management practices (SCMP) on supply chain

performance effectiveness (SCPE) of Sudanese manufacturing companies .and The quantitative method was employed, where convenience sampling and self-administrated survey questionnaires were sent to 110 manufacturer companies in Sudan. The study has found many empirical results which indicate that the practices of supplier's management have a significant positive effect on supply chain performance effectiveness. Furthermore the result of factor analysis adds a new dimension for supply chain management practices of Sudanese manufacturing companies. On the other hand the study has some limitations are in its focused on the manufacturing sector. Also the data were only collected from single respondents in an organization. The Practical implications this study it may explain to decision-makers and managers the importance of supply chain management practices on increase the supply chain performance effectiveness

1.3.1. At the practical level

By developing and validating a multi-dimensional construct of SCM practices and by exhibiting its value in improving operational performance of SMEs, it provides SCM managers with useful tool for evaluating the efficiency of their current SCM practices. Second, the analysis of the relationship between SCM practices and operational performance indicates that SCM practices might directly influence operational performance of SMEs.

1.4. Research Questions

How we can enhance the SCM Performance Effectiveness?

1.5. Research Objectives

The objective of this research is to examine the linkages between a firm's competitive environment, TQM, supply base management, and customer relation practices, and firm performance. This objective is driven by the notion that although firms have reengineered their internal operations to achieve higher quality levels, they have also become more dependent on their suppliers. As noted earlier, firms that have out-sourced non-core activities have realized they must now effectively manage the performance and capabilities of their suppliers of outsourced products and services. It can therefore be surmised that firms reporting the highest levels of financial and operational performance will be emphasizing not only internal quality initiatives, but also initiatives relating to the management of all elements of their supply chain including customers and suppliers, and the quality of delivered products. To test this proposition, the following hypotheses are proposed:

- A firm's competitive environment and management's responsiveness to it affects its

- performance.
- The use of TQM tools and practices positively affects performance.
- Effective management of the supply base positively affects performance
- A customer relations focus is positively related to high levels of performance.

1.6. Research Hypotheses

The SCM framework developed in this study proposes that SCM practices have a direct impact on the operational performance of SMEs. SCM practices are expected to increase an organization's operational performance through flexibility, reduced lead time, cost saving, resource planning, reduced inventory level and forecasting. As noted earlier, various SCM practices have an impact on various aspects of operational performance. This leads to the following hypothesis:

H1. with higher levels of SCM practices will have higher levels of operational performance.

SCM practices influence not only operational performance, but also SCM-related organizational performance. They are expected to enhance the sales, integration between its departments and coordination with its suppliers and customers. Thus, we expect that:

H2. with higher levels of SCM practices will have higher levels of SCM-related organizational performance.

The relationship between financial and non-financial measures of organizational performance has long been discussed in organization and strategy literature. York and Miree (2004) argue that non-financial performance such as improved quality, innovativeness and resource planning should actually reduce costs, and thus have a

positive effect on measures of financial performance. Increased quality helps SMEs to retain current customers and create greater customer loyalty, which in return may increase market share and organizational performance (Rust et al., 1994). A number of prior studies demonstrate positive relationship between operational performance

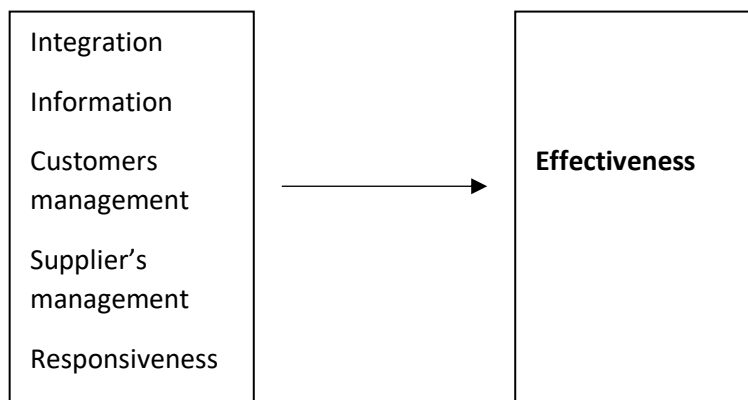
Impact of SCM practices109 dimensions such as product quality, (Larson and Sinha, 1995) innovation and R&D

(Prajogo and Sohal, 2001; Singh and Smith, 2004) employee performance

(Fuentes-Fuentes et al., 2004). Increase in operational performance may lead to high levels of organizational performance related to SCM in terms of increased sales, organization-wide coordination and supply chain integration. Hence, a positive

relationship between operational performance and SCM-related organizational performance can be proposed.

1.7. Research Model



1.8. Research Methodology

3.1 Sample and data collection

A survey instrument was developed to investigate the impact of SCM practices on the performance of SMEs. The questionnaire was pre-tested several times to ensure that the wording, format, and sequencing of questions were appropriate. Occasional missing data on variables was handled by replacing them with the mean value. The percentage of missing data across all data were calculated to be relatively small. There is no consensus on the definition of SME, as variations exist between countries, sectors and even different governmental agencies within the same country

(Yusof and Aspinwall, 2000). In line with small business research, this study adopted the number of employees as the base for the definition of SME. An SME is identified as one that employs fewer than 250 staff. The minimum of at least ten employees was also chosen in order to exclude micro firms that would not be suitable for the purposes of this study. This range is consistent with the definition of an SME adopted by both the Turkish State Institute of Statistics (SIS) and Turkish Small Business Administration and also by a number of European countries such as Norway and Northern Ireland (Sun and Cheng, 2002; McAdam and McKeown, 1999).

Data for this study was collected using a self-administered questionnaire that was distributed to 800 SMEs operating in the manufacture of fabricated metal products and general purpose machinery (NACE codes 28 and 29) within the city of Istanbul in

Turkey. For centuries as being the largest city of Turkey, Istanbul has been undisputedly the main industrial and trade centre. The city of Istanbul accounts for nearly 75 per cent of total capital investment generating nearly 23 per cent of Turkish GNP (Berkoz and Eyuboglu, 2005). The sample was selected randomly from the database of Turkish Small Business Administration (KOSGEB). The KOSGEB database includes a total of 12,270 SMEs in Istanbul, which accounts for nearly 28 percent of all SMEs registered throughout Turkey. The sampling frame consists of 1,917 SMEs operating in both industries in Istanbul.

It was requested that the questionnaire be completed by a senior officer/executive in charge of SCM practices. The responses indicated that a majority of the respondents completing the questionnaire were in fact members of the top management. Of the 800 questionnaires posted, a total of 229 questionnaires were returned after one follow-up. A total of 26 questionnaires were eliminated due to largely missing values. The overall response rate was thus 25.4 percent (203/800), which was considered satisfactory for subsequent analysis. A comparison of the annual sales volume, number of employees and sub-industry variation revealed no significant differences between the responding and non-responding firms ($p > 0.1$). Thus, the responses adequately represented the total sample group.

3.2 Measurement of variables

Based on the literature, a set of twelve SCM practices that are applicable to SME context were identified. These practices included “close partnership with suppliers” “close partnership with customers” “just in time supply” “e-procurement” “outsourcing” “subcontracting” “3PL” “strategic planning” “supply chain benchmarking” “few suppliers” “many suppliers” and “holding safety stock”. Respondents were asked to what extent the following SCM practices were implemented in their organizations relying on five-point scales ranging from 1 ¼ “not at all implemented” to 5 ¼ “fully implemented”.

It is generally recognized that it is difficult to select a single measure of firm performance. The literature lists several quantitative objectives that can be set to guide performance over a period of time, as well as qualitative objectives (Hunger and

Wheelen, 1993; Thompson, 1993). It has been argued that as there are obvious difficulties in obtaining quantitative measures, there is a strong a priori case that qualitative measures should be included in assessments of performance (Chakravarthy, 1986). Therefore, the subjective approach has been used extensively in empirical studies, based on executives' perceptions of performance, having been justified by several writers.

SME performance in this study was measured at two levels. A list of six operational (OPER) and five SCM-related organizational performance (ORG) measures were identified. The former group of performance indicators includes "reduced lead time in production" "cost saving" "forecasting" "resource planning" "reduced inventory level" and "flexibility" while the latter group includes "increase in sales" "more accurate costing" "increase in coordination between departments" "increase in coordination with suppliers" and "increase in coordination with customers". Respondents were asked to indicate on a five-point scale, ranging from "definitely better" through "about the same" to "definitely worse" or "don't know" how their business had performed over the last three years relative to their major competitors on each of the operational and SCM-related organizational performance criteria.

The items used to measure SCM practices, operational and SCM-related organizational performance of SMEs are reproduced in Appendix 2.

1.9. The Suggested Project Structure

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Research Methodology

Chapter 4: Statistical Analysis

Chapter 5: Findings` Discussion and Conclusion

2.Chapter 2: Literature Review

2.1. Introduction

Small and medium enterprises (SMEs) in the manufacturing industry require the implementation of strategies that allow them to make decisions that influence the process of obtaining results that are consistent with the objectives designed by managers [4-5]. Porter [6] has argued that an appropriate strategy is important for the development of SMEs, which makes it necessary for the businessmen to focus on assessing the specific needs of manufacturing SMEs and thus align their strategies [7- 9]. The increasing integration of information and communication technology (ICT) has led to favorable results in terms of goal accomplishment either generally or specifically in the functional areas of organizations [10-11]. The implementation of ICT in businesses such as manufacturing SMEs should be integrated in dynamic areas, such as the management of the supply chain [12], as this allows for better controls in the management of material resources, avoiding delays in production and thus enhancing compliance with customers [10 y 13]. This raises several research questions: Does the integration of strategies allow for a better usage in the adoption of information and communication technology? Does a greater integration of information and communication technology improve the supply chain management in manufacturing SMEs.

2.2. The independent variable

Stepwise multiple linear regression was used to develop models relating the two measures of performance to the twenty-three independent variables. Significance levels of 0.10 were used for entering and exiting variables respectively. The Durbin-Watson was used to verify that residuals were independent and normal probability plots were used to verify that residuals were normally distributed.

2.3. The dependent variable

also become more dependent on their suppliers. As noted earlier, firms that have outsourced non-core activities have realized they must now effectively manage the performance and capabilities of their suppliers of outsourced products and services. It can therefore be surmised that firms reporting the highest levels of financial and operational performance will be emphasizing not only internal quality initiatives, but also initiatives relating to the management of all elements of their supply chain including customers and suppliers, and the quality of delivered products.

To test this proposition, the following hypotheses are proposed:

H1: A firm's competitive environment and management's responsiveness to it affects its performance.

H2: The use of TQM tools and practices positively affects performance.

H3: Effective management of the supply base positively affects performance

H4: A customer relations focus is positively related to high levels of performance.

2.4. The relationship between the independent and the dependent variables

Discussion

One competitive environment variable, CE4, was significant in both regression models. This provides evidence to support the assertion that competitiveness can be compromised if management fails to adequately analyze the competitive environment. The variable's negative correlation with growth and

ROA does however suggest that devoting resources to analysis of competitors' strategies and actions can compromise growth and returns on asset. Such an outcome could occur if the analysis causes an organization to act in a reactive manner in response to a competitor's strategy, and diverge from an

otherwise preferred strategy. The models also suggest that it is the strategies of competitors that impact competitiveness rather than specific actions they might carry out or their positioning in terms of aggressiveness or number of competitive strengths. Not surprisingly, overall industry competitiveness correlates positively with overall performance, further supporting acceptance of hypothesis H1.

The impact of quality on performance has been extensively discussed in the literature. The current analysis however shows that the impact quality has on performance depends on the dimension of

performance being measured. Only one TQM factor, TQM2, has a positive impact on growth and ROA. This reflects the fact that in a competitive environment, growth in sales, market share, or return on assets requires an organization to benchmark performance and implement mechanisms that allow it to respond

to competitive pressures. However, when one examines overall performance, three factors, TQM1, TQM4, and TQM6 are significant, providing further support for

hypothesis H2. The significance of these three factors illustrates the importance of having a strategic orientation towards quality rather than using piecemeal attempts to achieve quality. It also suggests the merits of a quality strategy that does not place undue attention on short-term performance.

The positive correlation between factor CR1 and the growth and ROA measure of performance is

significant for two reasons. First, it highlights the need to work with customers and identify their needs and expectations. Second, combined with the significance of using performance data in quality management, it demonstrates the importance of managing performance aggressively. In an intensely competitive environment, maintaining and improving one's competitive position requires efforts to better

anticipate market needs and to identify and eliminate potential weaknesses in performance. The importance of a customer-oriented strategy is further illustrated by the fact that enhancing customers' ability to seek assistance has the greatest impact on overall performance. This analysis provides support

for hypothesis H3. Managing the supply base has a significant impact on growth but not on overall performance. Evaluating suppliers and involving them in the decision making process are both positively related to growth and ROA. Supplier involvement has the greatest impact on growth and ROA of any of the six

factors included in the regression model. The significance of managing the supply base is consistent with recent evidence that suggests that managing the supply chain is crucial to enhancing performance. As organizations downsize and outsource key inputs, maintaining control over the quality of inputs, lead

times, and delivery reliability requires closer coordination with and involvement of suppliers throughout the production process. It also increases the need for organizations to ensure the quality of their suppliers.

2.5. Conclusion

Improving product and process quality have been well-established as ways by which organizations can respond to increased global competition. Now however, the challenges facing organizations go beyond improving quality. Organizations are increasingly faced with the reality that they cannot exist in isolation but are one piece of a complex chain of business activity. The results of this study support this notion and confirm that all three major components of a supply chain, suppliers, manufacturers, and customers, must be effectively integrated in order to achieve financial and growth objectives. Moreover, the results indicate well defined linkages between specific practices and performance. Successful management of the supply chain is the key to the long-term success of an organization. This cannot occur however if organizations implement business practices in an arbitrary, uncoordinated manner, or if they direct scarce financial resources to initiatives that are unlikely to yield positive outcomes. The results also highlight the fact that supply chain management initiatives alone cannot improve profitability and market share. With product life cycles shrinking, firms must unceasingly pursue new markets, new technologies, and improve cost and delivery performance. Supply chain management provides a framework within which to implement a well conceived market strategy, but it cannot undo the

effects of a poorly conceived one. It is therefore imperative for managers to ensure their quality and procurement implementation strategies, tactics, and measurements are correctly aligned with strategies in the areas of finance, operations, marketing, new product development, and sales.

Future research is needed to extend the findings of this study. The study has addressed the practices of organizations only one tier upstream and downstream. In the future, truly integrated supply chains may consist of multiple organizations in a chain working together to bring the latest technological innovations and products to customers at the lowest cost in the shortest time. There is a need to understand how future strategies will unfold and how organizational strategies will merge given different competitive objectives. An additional question is how will companies share financial rewards.

Table 1: Dimensions of SCM practices

No	Author	Dimensions
1	Chin et al. 2011	information sharing, customer relationship, strategic supplier partnership, material flow management and corporate culture.
2	Inda , et al , [35]	Strategic supplier partnership , customer relationship , information sharing
3	Chowa , et al , [52]	There are four elements (suppliers and customer mgt , information sharing , speed of communication , supply chain features)
4	Min & Mentzer , [58]	There are seven elements of supply chain practice such as a greed vision and goals, information sharing, risk and award sharing, cooperation, process integration, long-term relationship and a greed supply chain leadership.
5	Chen & Paulraj [28]	Using supplier base reduction , long-term relationship , communication , cross-functional teams and supplier involvement to measure buyer supplier relationships
6	Tan, Lyman and Wisner, [14]	Six elements of supply chain practice (using factor analysis) supply chain integration , information sharing supply chain characteristics customer service management , geographical proximity and JIT capability
7	Alvarado & Kotzab , [59]	Using inter-organizational system in supply chain practice such as EDI , and elimination of excess stock levels by postponing customization toward the end of the supply chain
8	Tan , Kannan and Handfield [13]	Supply chain practice includes purchasing quality , and customer relations
9	Donlon , [60]	Supply chain practice includes supplier partnership , outsourcing cycle time compression , continuous process flow and information sharing

Table 2: Rotated Factor Loading for supply chain management practice

Items No:			Components				
			1	2	3	4	5
Integration							
Inte1	Searching for new way to integrate supply chain activities	.799	.144	.110	.223	.135	.141 .242
Inte2	Improving the integration activities across your supply chain	.736	-.109	.275	.069	.375	.158 .105
Inte5	Involving supply chain on your product service marketing plan	.729	.075	.377		-.011	.150
Inte4	Establishing more frequent contact with supply chain members	.671					
Information sharing							
Info1	Creating supply chain management teams to include different companies	.277	.748	.108		.034	-.037 -.007
Info4	segmenting customers based on service needs	.095	.747	.066		.333	-.013 .401
Info5	The company is working to create an appropriate information system	.225	.740	.191		.199	-.119
Info2	use of informal information sharing	.083	.734	.060			
Customers & delivery management							
Suppl1	On-time delivery directly to customers points of use	.118	.155	.895		.037	.180 .222
Suppl2	On-time delivery directly to your firm's points of use	.121	.131	.865			.001
Suppliers management							
Suppl5	participating in the sourcing decisions of suppliers	.028	.112	.087			
Suppl6	The company deals with a third party who specializes in business logistics and supply						
			.177	.064	.039	.798	-.102
Suppl4	aiding suppliers to increase their JIT capability						
			.250	.008	.284	.565	.316
Speed of Responsiveness							
Spe4	communicating customers' future strategic needs						
Spe3	identifying additional supply chain needs		.181	.043	.056	.088	.817
			.333	.206	.178	.192	.715
Eigenvalues			5.327	1.640	1.44	1.235	1.018
Variance Explain							
Total Variance Explained (%) Kaiser-Meyer-Olkin (KMO) Bartlett’s Test of Sphericity							
Percentage of							
17.14	16.373	12.681	12.45	12.425	9		
71.07 .794 670.587							

Table 3: Rotated Factor Loading Supply Chain Performance

Effectiveness									
Eff3	Warehousing costs	.144	.865	.180	Eff4	Inventory costs	.231	.838	.105
Eff2	Transportation costs	.108	.813	.288	Eff5	Total logistic costs	.266	.795	.086
Sales (SDG)		.436	.509	.316					

Table 4: Cronbach's Alpha

Construct	Variable	Number	Cronbach's of items	alpha
Supply	Integration	4	.810	
management	Information sharing	4	.793	practices
	&delivery management			Customers
	Suppliers &	2	.70	management
	Speed of	2	.700	responsiveness
	Supply chain	5	.886	performance
	effectiveness			

Table 5: Person's Correlation Coefficient for All Variables

Table 5: Person's Correlation Coefficient for All Variables					Mean	W1	W2	W3	W4	W5
Variables										X1
Supply chain	3.71	1 practice								
W2	3.52	.476**	1 information							
sharing										
W3 customers	3.43	.345**	.317**	1 &delivery mgt						
W3 suppliers	3.26	.413**	.245*	.306**	1 management					
Speed of	3.72	.538**	.381**	.296**	.369**	1 responsiveness				
X2	3.3	0.098	0.105	0.03	-0.094	0.044	1 Effectiveness			

Table 6: Multiple Regressions: supply chain management practices Variables, and supply chain effectiveness (Beta coefficient)

Variables	Effectiveness	Supplier s management	.232**	Integration	.181	Information	
sharing	.046	Customers management	.021				
Speed of responsiveness	.068	R ²	.069	Adjusted R ²	.022	Δ R ²	.069
F change	1.475	***					

Note: Level of significant: *p<0.10, **p<0.05,***p<0.000

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3. Chapter 3: Research Methodology

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Dedication

To my family and friends for their love and support throughout my studies, I will forever be grateful.

Abstract

Firms exist in a dynamic environment that is unpredictable thus the need to efficiently and effectively of operations as they maintain consistency in ensuring value creation through the supply chain. Therefore this research seeks to explore on value chain management practices adopted by large manufacturing firms in Kenya and also determine the relationship between these practices and supply chain performance. The study outlines three categories of value chain management practices that include procuring and sourcing, operation excellence and supply chain design network and distribution. The large manufacturing firms differ in their scope of operation and therefore need to clearly identify their value chains and aim to manage them to ensure that value is created in the present and future undertakings. The study targeted 46 large manufacturing firms in (SCM) but managed to get response from 35 firms. This represented 76% response rate. Data was collected using closed- ended questionnaires applying the 5 Likert point scale (See Appendix I). Data analysis was done using Microsoft Office Excel 2007 application and facts analyzed to give results. The findings of the study were that value chain management practices determine supply chain performance and that different firms adopt practices that best suit their sector in order to enhance supply chain performance. Sales maximization was the main supply chain performance measure that clearly brought to light the needs to ensure right practices are adopted leading to the conclusion that there is a relationship between value chain management practices and supply chain performance.

Purpose:

Supply Chain Practices

Stock and Boyer (2009) defined SCM as ‘the management of a network of relationships within a firm and between interdependent organizations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction’. Researchers have pointed to several objectives and goals of SCM. Williams (2006) stated that organisations can improve profit and market share by improving the effectiveness of supply chain partners. Productivity may be increased by short-term objectives, but that will increase the frequency of cycle time and inventories. Cook and Heiser (2011) defined that the SCM consists of many components such as information sharing, longrange relationships, advanced planning techniques, leveraging the internet, and supply and distribution network structures. The findings of their research indicate that there is a positive effect of SCM practices on organisational performance.

Engelseth and Felzensztein (2012) explored that responsiveness in a supply network may be integrated from combined relationship marketing (RM) and SCM. They suggested developing responsiveness to technically generate value through the supply network by-product transformations and to know what the end-user perceives as value. As they define, SCM is useful to generate value through technical product-transforming processes and RM helps customers perceive value in the context of business relationships. They propose intertwining SCM

and RM competencies to achieve responsive product supply from both end-user and multi-tier supply network perspectives. They suggest this approach as useful in both strategic planning of a company’s role in a wider supply chain setting and planning of cross-functional teamwork

in operations. Daghfous and Barkhi’s (2009) research is related to the implementation of SCM practices in UAE hotels. Their research states that before competing on knowledge,

there must be adequate Information and Communication Technology (ICT) infrastructure to support the implementation of best practices. They suggested more

systematic planning and learning from other industries, such as the manufacturing and retail industries.

The application of the integrative approach to the supplier and buyer exchange differentiated products and beneficiate from knowledge spillovers (possibly impulse by R&D subsidies). The main result is that the effect

Methodology:

3.0. Introduction

The intent of this section is to describe the methodology that is proposed for such a research effort. Included in the section is a description of the proposed research design, population of interest, sample design, proposed data collection methods and analysis efforts.

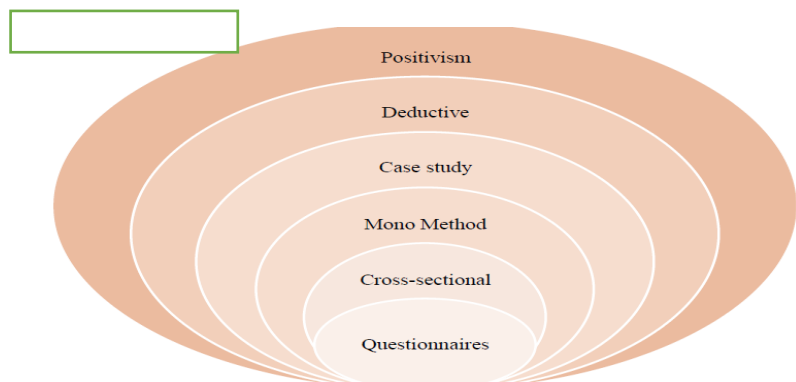
Findings:

3.1. Research Design

The study employed descriptive research design. This type of research design is used to identify and classify the elements or characteristics of the subject, in this case the value chain management practices adopted by large manufacturing firms and how they relate to supply chain performance (Neville, 2007).

3,3. Research design

- **Research philosophy:** Positivism
- **Research approach:** Deductive
- **Research strategy:** Case study
- **Research choice:** Mono Method
- **Time horizon:** Cross-sectional
- **Data collection and analysis techniques:** Questionnaires



3.2. Population

The target population comprised all large manufacturing companies, members of Association of Manufacturers.

3.3. Sampling Design

The sample of was selected using proportionate stratified random sampling method (Van Dalen, 1979). This method was found appropriate as it ensured a greater representativeness in the sample of the population. A sample frame was drawn from Association of Manufacturers directory consisting of approximately 455 large manufacturing firms.

3.4. Research population & Sampling methods and technique

3.4.1. Research Population

Table number (1) Research Population

Sector or company name	Classifications	Number of employees
	Top Managers	2
	Stuff	8

Originality & Implication:

3,5. Data collection method

The study utilized quantitative data. Quantitative data involves collecting data from a population or from one or more large samples that represent the population, in a form that is easily converted to numerical indices (Leedy Ormrod, 2001).The research instrument was a semi structured questionnaire (appendix II). The questionnaires were administered through two methods namely; self-administered questionnaires and researcher administered questionnaires. The questionnaire was divided into various sections following the research objectives. Section I of the instrument had general information, Section II sought to answer the research objective I, Section III sought to address research objective II while section IV sought to address research objective III. Most of the questions were close-ended to allow easy coding, faster responses and direct research to relevant and desirable variables hypothesized as possible challenges. Three questionnaires were distributed to each research institution. These were sent to the supply chain manager, finance manager and the CEO/deputy CEO.

3,5,1. Independent variable (cost-effectiveness)

The researcher relied onthe questionnaire of Kanaan(2022) .In order to measure the independent variable (cost-effectiveness), interms of three dimensions: cost reduction, flexibility, and quality, overall10items for the entire variable. Whereas the cost reduction dimension consists of3elements, the flexibility dimension It consists of3 elements, and the quality dimension consists of4 elements. Type of instrument is Likert

Strongly agree, agree, neutral, disagree, strongly disagree

Table number (2) Independent variable

Variable	Dimension	Number of items	source
Cost-effectiveness	Cost Reduction	3	Kanaan, (2022)
	Flexibility	3	
	Quality	4	
	Overall	10	

By the researcher,(2024)

3,5,2. Dependent variable (project success)

The researcher relied on onthe questionnaire of Israa, (2022). In order to measure the independent variable (project success), in terms of one dimension, which is the projects' success with the total

14 items for the entire variable. The instrument type is Likert

Strongly agree, agree, neutral, disagree, strongly disagree

Table number (3) Dependent variable

Variable	Dimension	Number of items	source
Project Success	Project Success	14	Israa, (2022)

By the researcher,(2024)

Keywords: *Supply Chain Process, Supply Chain Management, Management Practices, Customer Relationship Management, Logistics Process, Output Performance*

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SCM: Supply Chain Management

PPDA: Public Procurement Disposal Act

PPOA: Public Procurement Oversight Authority

SME'S: Small and Medium Enterprise

EDI: Electronic Data Interchange

SCOR: Supply Chain Operations Reference

BSC: Balanced Score Card

STI: Science Technology Innovations

NCRC: National Crime Research Centre

TRF: Tea Research Foundation

CRF: Coffee Research Foundation

List of Tables:

4. Chapter 1: Introduction

4.1. Research Background

Background of the Study.

This chapter provides the conceptual background of the study by introducing the idea of Supply Chain Management Practices in relationship to performance among public research institutions in Kenya. Organizations can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. Interest in the concept of supply chain management has steadily increased since the 1980s when organizations saw the benefits of collaborative relationships within and beyond their organizations.

A number of definitions have been proposed concerning the concept of the supply chain and its management. Supply chain is defined as the functions within and products that provide services to the customer (Cox *et.al.* 1995). Another source defines supply chain as, the network of entities through which materials flows. Those entities may include suppliers, carriers, manufacturing sites, distribution centers, retailers, and customers (Lummus and Alber, 1997). According to the supply chain council (1997), the supply chain involves all stages of production and delivery of a final product, from the supplier's supplier to customer's customer.

According to Quinn (1997) the supply chain can be seen as all those activities associated with moving goods from the raw-materials stage through to the end user. This includes sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing, and customer service. Importantly, it also embodies the information systems so necessary to monitor all those activities. Eilram and Cooper (1993), define supply chain management as an integrating philosophy to manage 2

the total flow of distribution channel from supplier to ultimate customer. Christopher (1998) stated that an effective SCM is a powerful tool to achieve competitive advantage for all parties in the supply chain. According to Tan (2001), the ultimate goal of SCM is to integrate various members of the supply chain and a seamless manner to achieve high level of customer satisfaction and thus a long term competitive advantage.

4.1.1 Supply Chain Management

The public sector is under pressure from both internal and external sources to demonstrate improvements in their performance (McAdam *et.al.* 2005). Local/municipal entities and other government departments are taking an interest in supply chain performance measures and reporting for improving performance and increasing accountability (Barry 2000; Berman & Wang 2000). Public sectors need to review the way they plan, prepare budgets, implement and

manage programs and deliver services to meet the government's and citizens' demands for improved performance and accountability. Countries such as Australia, Britain, South Africa and New Zealand have instituted public sector reform to improve their performance and consequently many organizations are going through the process of change management (Boyne 2003).

As part of overall management strategy, the managers of public organizations need to measure performance to evaluate whether departments are performing as expected, to ensure that the employees are doing the right things, to motivate line staff/middle managers and the stakeholders to do things necessary to improve performance, to determine the budgeting priorities such as on which programs the agency should be spending the public's money, to convince legislators/stakeholders that the agency is doing a good job, to learn whether the activities are working, and determine exactly who 3

should do what to improve performance (Behn 2003). There is growing recognition that using performance measures to gauge success is vital to any organization, in the private or public or non-profit sectors (Niven 2005).

Measuring performance, however, has been a challenge for both managers and researchers (Maltz *et.al* 2003) as the process of 'designing and implementing an effective performance management system' involves 'addressing a number of methodological issues' and managing the change process Poister (2003). In spite of having workable performance management systems in place in public organizations. 'many of those systems fall apart' before they are complete and also there are other which 'end up installing a system that is not helpful or is simply not used effectively' (Poister 2003).

There are different types of performance measurement systems that can be applicable to public sector supply chains. Some of the common performance measurements methods include the balanced scorecard, SCOR model and benchmarking (Handfield *et.al.*, 2009). The Balanced Scorecard (BSC) approach to performance measurement was developed by Kaplan and Norton (1992-1996) as a way to align organizational performance measures with its strategic plans and goals (Fawcett *et.al.*, 2007 Wisner *et.al.*, 2008). The SCOR model is used as a SCM diagnostic, benchmarking and process improvement tool by manufacturing and service firms in a variety of industries around the globe (Wisner *et.al.*, 2008)

Countries such as the UK, US and Canada have long employed SCM in the management of their procurement and logistics. For instance, Gangster *et.al* (2004) acknowledged that the Department of Defense (DOD) in the US has minimized cost through lead time in the 4

management of its logistics by employing SCM practices. Also, the office of Government of Commerce (OGC) in the UK releases year to year updates about best practices of SCM in the public sector. In the past decades, the Public Procurement System in Kenya (SCM) has undergone significant development.

From being a system with no regulation in 1960's and system regulated by treasury circulars in 1970's 1980's and 1990's, the reasons for slow growth was occasioned by lack of guidelines for creating alliances with supply chain partners. Failure to develop measures for monitoring alliances, inability to broaden the supply chain vision beyond procurement of production distribution to encompass larger business processes, inability to integrate the organizations internal processes, lack of trust inside and outside the organization, organizational resistance to the concept, lack of integrated information systems and electronic.

In Kenyan context supply chain can be broadly broken down into four main sectors that is, SCM at Public Sector, Private Sector, Non governmental institutions and the donor sector. All the above sectors have resulted to the management of supply chain as a result of the need to be efficient and flexible and to achieve this there must be proper supply chain management. Kenneth and Brian (2006) Public sector is composed of the National government, local government, government owned and controlled agencies and corporations and monetary institutions.

4.1.2 Public Research institutions

Most modern economies hinge their growth strategies on their resources, research, innovation and technological abilities. The introduction of Research, Innovation and 5

Technology (RIT) Sector during 2008/09-2011/12 Medium Term Expenditure Framework (MTEF) period marked an important policy decision geared towards making Kenya knowledge based economy (GoK, 2012). The Sector has a major responsibility of facilitating the process of acquiring new knowledge in a systematic way in order to produce and /or improve products and processes. The Sector therefore explores opportunities associated with the convergence of research, innovation and technology to spur economic growth in the country.

A Knowledge based economy relies heavily on innovations to transform resources into products, processes and services. This requires clearly defined and supportive policies, institutional and legal frameworks that effectively address citizens' needs and aspirations. In order to ensure effective exploitation of knowledge, the Sector plans to; Provide economic and institutional systems with incentives for efficient use of existing knowledge, new knowledge creation, and entrepreneurship; Develop an educated and skilled population that can create, share and use knowledge well; Develop a dynamic information and communication infrastructure (ICT), that facilitates collection, processing, storage, retrieval and dissemination of information; and establish centers of excellence that tap into the growing stock of global knowledge, assimilate and adapt to local needs, while furthering new knowledge and technologies (GoK, 2012).

The increasing complexities in the business environment, resource scarcity and the rising customer expectations are causing economic shifts that destabilize world economies. (OECD, 2007) Only countries with RIT capabilities can ensure sustainability and development of their economies. The Research Sub-Sector is therefore expected to bring about socio-economic transformation of the country, foster national prosperity and global 6

competitiveness, enhanced efficiency, sustained growth and promotion of value addition in goods and services.

The three pillars Vision 2030 namely; Economic, Social and Political rely heavily on this Sector. Kenya has 12 publicly funded research institutions with mandates to conduct research in various key policy areas. The main areas covered include agriculture, policy, information technology, forestry, industry, marine and crime prevention (see appendix II for list of institutions).

4.2. Research Problem

- 4.2.1. the strongest economy in Eastern Africa region has taken a strong development path by institutionalizing research institutes in various aspects in a bid to meet its growing population demands (USDS, 2010). However with an increasingly knowledgeable population, such government agencies are facing ever increasing demands for accountability and quality services. The research institutions have to deliver on their core mandates while at the same time facing budgetary limitations. Faced with this challenge, research institutions have to re-evaluate their operations and seek greater efficiencies so as to reduce costs.
- 4.2.2. One of the major areas that have been identified as having great potential to improve efficiencies and reduce costs is in the supply chain. Burgess et.al (2006) noted that SCM has become very important but there appears to be little research that is focused on supply chain practices. Supply chain management coordinates and integrates the activities of supply chain members into a seamless process at a minimum cost (Cox, Blackstore, and Spencer, 1995). Any inefficiency incurred by any of the supply chain
- 4.2.3. members can impact on the performance of the whole chain. This is because the inefficiencies get translated into increased costs.
- 4.2.4. The right information exchanged in the SCM at the right time can help improve the performance of all the members in the chain (Chopra & Meindl, 2004) by reducing the bullwhip effect (Hav, Padmanabhan, & Whang, 1997). Information is a key factor in managing and coordinating the supply chain and therefore, has to be carefully managed so that all the supply chain members can achieve their objectives.

A number of studies on SCM practices had been conducted. For instance Mogire (2011) conducted research on Supply Chain Practices in five star hotels in Kenya. Orukoh (2007) examined SCM practices in Numerical Machining Complex Ltd. He established that the company had not institutionalized a collaborative relationship with its suppliers and suggested that effective communication, continuous improvement, competitiveness, culture, quality control and review were required as good supply chain management practices. However, the study did not try to find out the relationship between SCM and performance. Mwirigi (2007) studied green supply chain management practices by manufacturing firms in Kenya. However, the study focused more on the private sector hence there is need to examine SCM in the public sector in Kenya. Gwako (2008) Studied Supply Chain performance measurement in Kenya Airways; This study was however limited in scope as it covered only one company hence there is need to widen the scope and find out SCM practices in public sector in Kenya. Onyango (2011) studied supply chain management practices and performance in cement industry in Kenya. Mogire (2011) conducted research on Supply Chain Practices in five star hotels in Kenya. he established that the major hindrances to be collaboration during planning, lack of understanding of the Supply Chain Management Concept. The study also established that there was strategic relationships with suppliers and customers within the Hotel industry it did not reveal about long term relationships between suppliers and clients. Even though the study shows that five star hotel industry have adopted supply chain

4.2.5. practices in their operations they have also not fully embraced the Practices.

Mwirigi (2007) studied green supply chain management practices by manufacturing firms in Kenya. In the study she looked into four areas of GSCM practices namely green purchasing, design for environment, reverse logistics and green marketing. The research established that environmental challenges posed by GSCM practices contributed to environmental challenges a proportion which is contributed by manufacturing firms. This research also had some limitations because the study did not address how green supply chain practices impact on performance towards service delivery.

4.2.6. However, none of these studies has sought to demonstrate the link between supply chain management practices and firm performance in research based institutions.

4.2.7. As evidenced in the above studies there is no known study that has focused on addressing this gap. This study therefore seeks to answer the following question: What are the supplies Chain Management Practices among research institutions? What impact does SCM practices have on performance of service delivery? What challenges do public sector in Kenya face while implementing SCM practices?

4.3. Research Significance

In this section, the student should clarify the importance of the study at the theoretical level, and the empirical level

5.Chapter 2: Literature Review

5.1. Introduction

This chapter presents the results of the field study that were statistically analyzed using both: The current chapter of the statistical analysis includes the SPSS 3.0 statistical program. Testing the validity and reliability of the questionnaires used. SPSS V. Descriptive statistics for the sample under study using 30. In addition, in order to test the required data collection from the current study sample using SPSS 3.0. The research hypotheses and the suitability of the model were confirmed, a simple linear regression analysis was conducted across 30 statistical results through the use of SPSS

5.2. The independent variable

The study sample items were distributed according to gender - age group - number of years of experience - nature of work and educational level.

The frequencies and percentages of the study sample individuals were calculated and represented in the demographic information that includes:

- Gender, which includes male, female**
- Age group, which includes less than 30 years, from 30 to 40 years, from 41 to 50 years, more**
- More than 50 years**
- Number of years of experience, which includes less than 5 years / from 5 - to 10 years / from 11 - to 20 years / from 21 years and more**
- Nature of work, which includes leaders / employees / technicians**
- Educational level, which includes) secondary / university / postgraduate studies**

5.3. The dependent variable

The following table, figures and paragraphs illustrate the classification of the sample under study, as follows:

توصيف عينة الدراسة

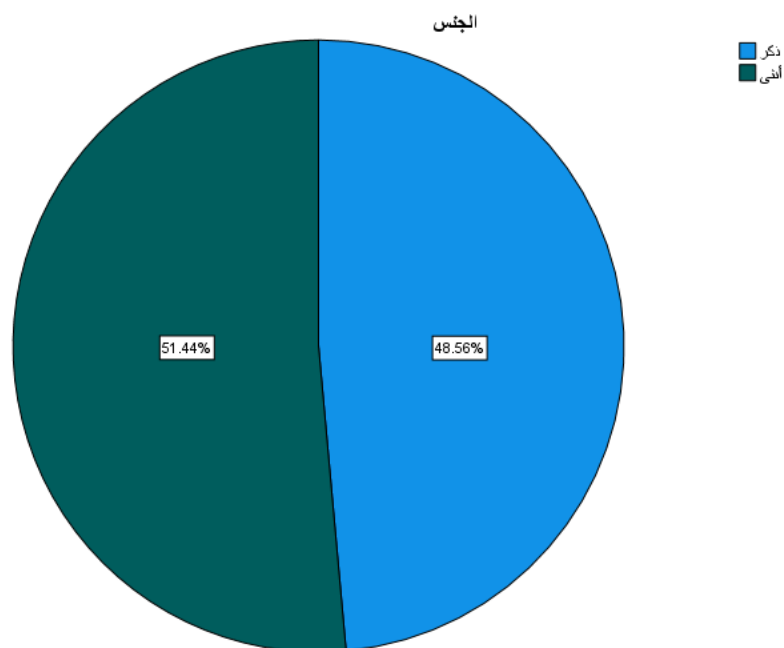
المتغير	فئات المتغير	العدد	النسبة من إجمالي العينة
النوع	١. ذكر	152	%48.6
	٢. انثى	161	%51.4
	إجمالي	313	%100
الفئة العمرية	١. أقل من ٣٠ سنة	141	%45
	٢. من ٣٠ سنة الى ٤٠ سنة	76	%24.3
	٣. من ٤١ إلى ٥٠ سنة	51	%16.3
	٤. أكثر من ٥٠ سنة	45	%14.4
	إجمالي	313	%100
سنوات الخبرة	١. أقل من ٥ سنوات	135	%43.1
	٢. من ٥ الى ١٠ سنوات	54	%17.3
	٣. من ١١ الى ٢٠ سنة	49	%15.7
	٤. من ٢١ سنة فأكثر	75	%24
	إجمالي	313	%100
طبيعة العمل	١. قيادات	81	%25.9
	٢. موظفين	207	%66.1
	٣. تقنيين	25	%8
	إجمالي	313	%100

المتغير	فئات المتغير	العدد	النسبة من إجمالي العينة
المستوى التعليمي	ثانوي	2	%.6
	جامعي	233	%74.4
	دراسات عليا	78	%24.9
	إجمالي	313	%100

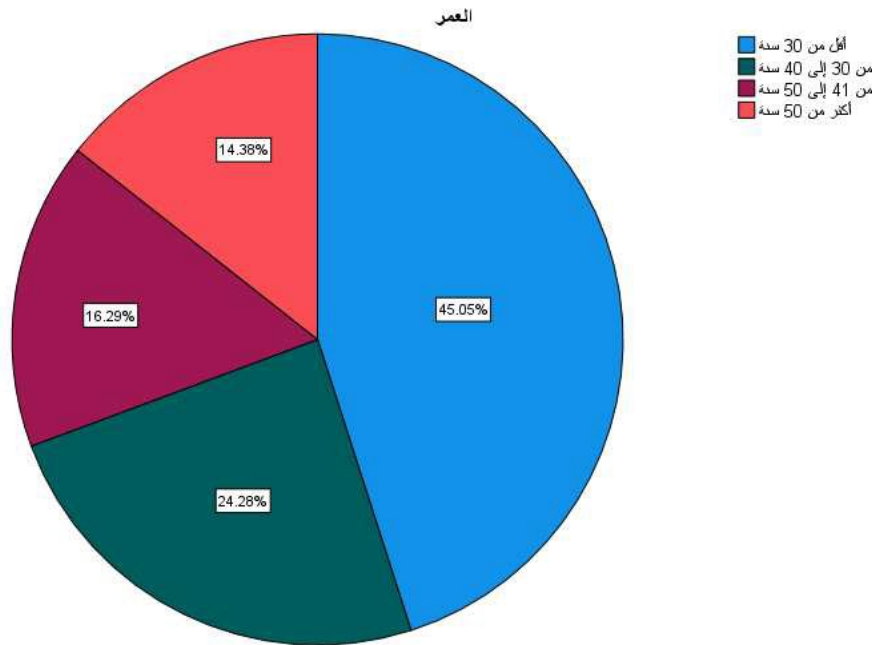
المصدر : من إعداد الباحث بالأعتماد على النتائج الإحصائية للدراسة الميدانية

From the data in Table No. the following results were extracted:

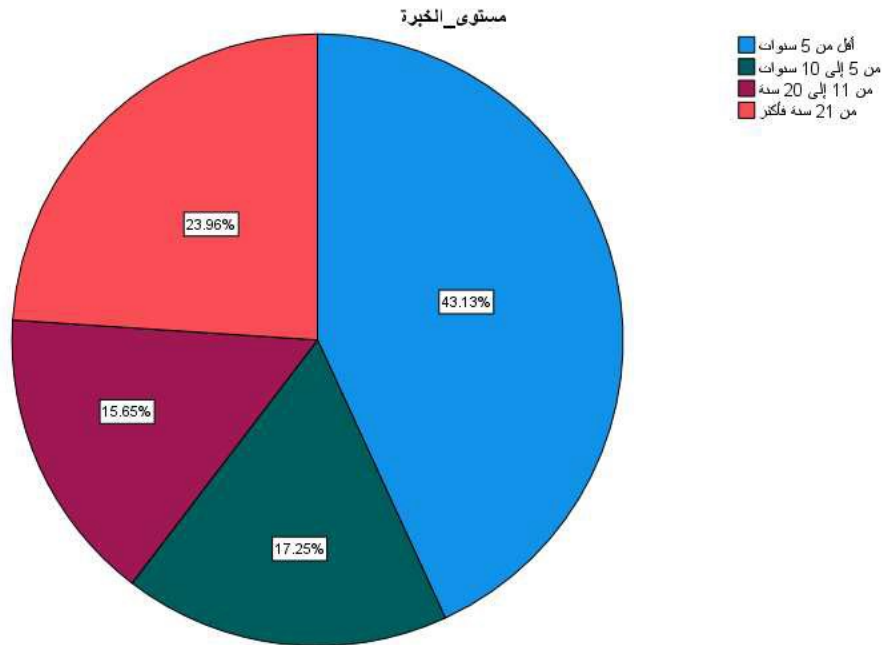
- Regarding gender: The statistical results showed that, despite the closeness of the number of males and females in the sample, the number of females is greater than the number of males, as the number of males reached 152 individuals, representing 48.56% of the total sample, while the number of females reached 161 individuals, representing 51.44% of the total sample. As shown in the following figure:



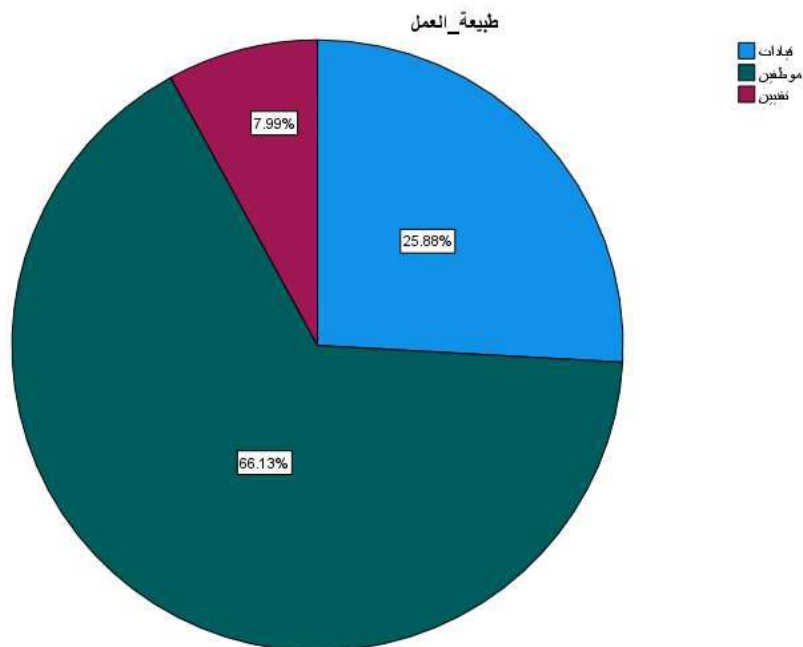
As for age: 141 items were less than 30 years old, representing 45%. While the age group from 30 to 40 years had 76 items, representing 24.3%. The age group from 41 to 50 years had 51 items, representing 16.3%. While the age group over 50 had 45 items, representing 14.4%. The following figure illustrates this.



Regarding the number of years of experience: 135 individuals had less than 5 years of experience, representing 43.1%. While the experience level of 5 to 10 years had 54 individuals, representing 17.3%. The experience level of 11 to 20 years had 49 individuals, representing 15.7%. While the experience level of 21 years or more had 75 individuals, representing 24% of the total sample. The following figure illustrates this.



Regarding the nature of work: the number of leaders in the sample was 81 individuals, representing 25.9%, while the number of employees was 207 individuals, representing 66.1%. Finally, the number of technicians was 25 individuals, representing 8% of the total sample. The following figure illustrates this.



As for the educational level: The number of those holding a secondary qualification was 2 items, representing 0.6% of the total sample individuals. While the number of those holding a university qualification was 233 items, representing 74.4% of the total sample individuals. Finally, the number of those holding a postgraduate qualification was 78 items, representing 24.9% of the total sample individuals. The following figure illustrates this.



3. Measuring the validity and reliability of the study tools

In order to verify the validity and reliability of the scales used in the study, the internal consistency validity of the questionnaires used to measure the study variables was tested, in addition to measuring the convergent validity by measuring the average

While, the reliability of the scales used was measured. Average Variance Extracted (AVE) The extracted variance

The value of the composite reliability, Cronbach's Alpha in the study was measured by measuring both: the value of Cronbach's Alpha

Structural equation through the structural equation model, rho-A and the value of the coefficient, Composite reliability

The following paragraphs and tables. Smart-PLS using the statistical analysis program 3.0, modeling (SEM)

show this.

Validity of the scales used in the study

The internal consistency validity of the scales used to measure the study variables was tested, in addition to measuring the convergent validity.

Average Variance Extracted (AVE) by measuring the average variance extracted

- Internal consistency validity: It means the extent of consistency of each statement of the questionnaire to the variable to which it belongs, so the researcher measured the internal consistency of the questionnaires by calculating the correlation coefficients between

The correlation coefficient, Kaiser (the degree of each statement and the total degree of the variable to which it belongs. According to the study (1974

Less than 0.5 is deleted from the questionnaire.

The average variance between the statements that measure the same scale was measured: Convergent Validity

Which should be greater than AVE, the average variance extracted

(Hair et al. from 0.5 according to (2006

T The following tables show the statistical results of (correlation coefficients, standard deviation, P-value, calculated, and AVE value) between the score of each statement and the total score of the variable to measure the internal consistency validity of the questionnaires. Also, the value of the average variance extracted was calculated as follows: SEM-PLS through the structural equation model

نتائج SEM-PLS الخاصة باختبار صدق الاتساق الداخلي والتفاريقي لمقاييس متغيرات الدراسة

المتغير		العبارة	معاملات الارتباط	Standard Deviation (STDEV)	T Statistics	P Values	AVE متوسط التباين المستخرج
تطبيق التحول الرقمي		ت ١	0.761	0.034	22.163	0.000	0.565
		ت ٢	0.725	0.041	17.839	0.000	
		ت ٣	0.735	0.037	19.904	0.000	
		ت ٤	0.718	0.040	17.925	0.000	
		ت ٥	0.623	0.038	16.362	0.000	
		ت ٦	0.752	0.034	21.931	0.000	
		ت ٧	0.762	0.030	25.737	0.000	
		ت ٨	0.798	0.022	36.813	0.000	
		ت ٩	0.824	0.020	41.053	0.000	
		ت ١٠	0.786	0.023	34.118	0.000	
		ت ١١	0.731	0.025	29.709	0.000	
		ت ١٢	0.740	0.023	32.023	0.000	
		ت ١٣	0.814	0.022	37.092	0.000	
		ت ١٤	0.747	0.025	29.691	0.000	
		ت ١٥	0.782	0.021	36.495	0.000	
		ت ١٦	0.682	0.028	24.621	0.000	
		ت ١٧	0.770	0.033	23.679	0.000	
		ت ١٨	0.760	0.032	23.953	0.000	
	0.758	خ ١	0.877	0.018	47.895	0.000	تخطيط الموارد البشرية
		خ ٢	0.877	0.015	57.153	0.000	
		خ ٣	0.893	0.015	59.936	0.000	
		خ ٤	0.896	0.017	52.972	0.000	

AVE متوسط التباين المستخرج		P Values	T Statistics	Standard Deviation (STDEV)	معاملات الارتباط	العبارات	المتغير	
0.736		0.000	62.481	0.014	0.900	خ٥		ممارسات إدارة الموارد البشرية
		0.000	25.034	0.031	0.773	خ٦		
	0.770	0.000	40.789	0.021	0.843	د١	التدريب والتطوير	
		0.000	61.850	0.015	0.900	د٢		
		0.000	68.587	0.013	0.896	د٣		
		0.000	67.899	0.013	0.892	د٤		
		0.000	40.543	0.021	0.857	د٥		
		0.000	41.716	0.021	0.875	د٦		
	0.680	0.000	56.191	0.015	0.853	ظ١	التوظيف (الاستقطاب والتعين)	
		0.000	53.791	0.016	0.855	ظ٢		
		0.000	41.122	0.021	0.849	ظ٣		
		0.000	17.861	0.039	0.697	ظ٤		
		0.000	41.871	0.020	0.841	ظ٥		
		0.000	42.395	0.020	0.841	ظ٦		

It is clear from the table above:

Digital transformation application scale: All correlation coefficients for all the phrases are strongly correlated with the variable ▪

dependent thereof, at values greater than 0.7. In addition, the values of all correlation coefficients for the phrases are statistically significant

at a significance level less than 0.001, accordingly, the internal consistency validity of the scale has been achieved. Also,

It is clear that its value for the application variable, AVE from the results above related to the value of the average variance extracted

0.5, accordingly, the convergent validity of the questionnaire has been achieved. > Digital transformation is 0.565

Human resource management practices scale: All correlation coefficients for the terms that measure the variable of human resource management practices (human resource planning function, recruitment function, training and development function) have a value greater than 0.7. In addition, the values of all correlation coefficients for the terms are statistically significant at a significance level less than 0.001. Accordingly, the internal consistency validity of the scale in its three dimensions has been achieved. Also, for the variable of human resource management practices AVE, the results above related to the value of the average variance extracted

as a whole, which equals 0.736. Also, the values of the average variance extracted for the dimensions of human resource management practices

0.770, (human resource planning function, recruitment function, training and development function) are: 0.758

0.680 respectively. Accordingly, the convergent validity of the questionnaire has been achieved.

3.2. Stability of the study tool

Questionnaire stability refers to: the stability of the questionnaire results and not changing them significantly if they were redistributed

Among the sample members several times during specific time periods. To measure the stability of the questionnaires used to measure the study variables, the values of Cronbach's alpha were calculated, the composite reliability

The three values must be greater than 0.7 in order for the scale to be stable.

Regarding the three values (alpha SEM-PLS), the following table shows the values extracted from the structural equation

(rho-A) and the value of Cronbach's composite reliability, the composite reliability

قياس الثبات لأدات الدراسة

Composite Reliability		rho_A		Cronbach's Alpha		عدد العبارات		المتغيرات	
0.959		0.956		0.955		18		تطبيق التحول الرقمي	
0.953		0.941		0.940		6		التدريب والتطوير	

Composite Reliability		rho_A		Cronbach's Alpha		عدد العبارات		المتغيرات	
0.969	0.927	0.966	0.905	0.966	0.905	18	6	التوظيف والاستقطاب والتعيين	ممارسات إدارة الموارد البشرية
	0.949		0.936		0.935		6	تخطيط الموارد البشرية	

المصدر: من إعداد الباحث بناءً على نتائج التحليل الإحصائي لبيانات الدراسة الميدانية. ن= ٣١٣ مفردة

It is clear from the table above that the values of the stability coefficients for the study scales are as follows:

Digital Transformation Application Scale: The statistical results showed that the values of (Cronbach's alpha, composite reliability) are: 0.956, rho-A value, and 0.959, respectively. Which indicates that all values are greater than 0.7. According to (Hair et al., 2010).

Human Resources Management Practices Scale: The statistical results showed that the values of (Cronbach's alpha, reliability) are: 0.966, rho-A value, and composite reliability) are: 0.966, rho-A value, and composite reliability, respectively. Also, the values of (Cronbach's alpha, composite reliability 0.949) for the dimensions of human resource management practices, respectively, are: human resource planning: (0.935 0.905), training and development: (0.927, 0.936), recruitment (attraction and appointment): (0.905 0.936) (Hair et al., 2010). This indicates that all values are greater than 0.7. According to (0.949, 0.935) (2010), the stability of the scale has been achieved. (

According to the statistical results above, which proved the validity and reliability of the scales used in the current study, which means the possibility of relying on their results and the validity of these questionnaires for application and trust, and using them in conducting analyses to test the study hypotheses.

5. Linear correlation coefficients between study variables

The following table shows the linear correlation coefficients (Pearson) between study variables, which were measured using

as follows: SPSS-V.30

معاملات الارتباط بين متغيرات الدراسة

المتغيرات/ المعنوية	تطبيق التحول الرقمي	ممارسات إدارة الموارد البشرية	وظيفة تخطيط الموارد البشرية	وظيفة التوظيف (الإستقطاب والتعيين)	وظيفة التدريب والتطوير
تطبيق التحول الرقمي	Pearson Correlation	.806**	.764**	.743**	.740**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001
	N	313	313	313	313
ممارسات إدارة الموارد البشرية	Pearson Correlation	1	.896**	.939**	.948**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001
	N	313	313	313	313
وظيفة تخطيط الموارد البشرية	Pearson Correlation	.764**	1	.746**	.760**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001
	N	313	313	313	313
وظيفة التوظيف (الإستقطاب والتعيين)	Pearson Correlation	.743**	.939**	1	.870**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001
	N	313	313	313	313
وظيفة التدريب والتطوير	Pearson Correlation	.740**	.948**	.760**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001
	N	313	313	313	313

** . Correlation is significant at the 0.01 level (2-tailed).

Linear relationship between the application of digital transformation as an independent variable and human resource management practices and their dimensions as a dependent variable:

- It was found that there is a strong positive correlation (0.806) between the application of digital transformation as an independent variable and the practices of human resources management (total) as a dependent variable at a significance level of less than (0.01).
- It was found that there is a strong positive correlation between the application of digital transformation as an independent variable and each dimension of human resources practices (human resources planning, recruitment, training and development) at a coefficient of 0.740, respectively, as dependent variables at a significance level of less than 0.743, correlation: 0.764
.0.01.

- It is noted from the above that the values of the correlation coefficients between the study variables are high, which indicates the strength of this correlation.

Linear correlation between the dimensions of human resources management practices and the variable of human resources management practices

As a whole, and between each other:

It is clear from the results of the previous table that there is a positive significant correlation between human resources management practices And its dimensions (human resources planning, recruitment/attraction and appointment, training and development) at a significance level of (0.01).

6. Results of testing the study hypotheses

This section is concerned with testing the validity of the main hypothesis of the study and the sub-hypotheses that follow it. The statistical results that were reached using both the statistical package 30

are displayed as follows:

The main hypothesis of the study:

- There is a positive statistically significant relationship between the application of digital transformation and the practices of human resources management in the Egyptian banking sector

This main hypothesis has sub-hypotheses as follows:

F1: There is a positive statistically significant relationship between the application of digital transformation and the human resources planning function.

F2: There is a positive statistically significant relationship between the application of digital transformation and the recruitment function "

attraction, selection and appointment".

F3: There is a positive statistically significant relationship between the application of digital transformation and the training and development function.

Results of testing the main hypothesis of the study:

This hypothesis states that "- There is a positive statistically significant relationship between the application of digital transformation

and human resources management practices in the Egyptian banking sector

Simple Linear Regression To test this hypothesis, the simple linear regression analysis method was used between the application of digital transformation under study as an independent variable and human resources management practices (overall) Analysis as a dependent variable.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.806 ^a	.650	.649	.403

a. Predictors: (Constant), تطبيق_التحول_الرقسي

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	94.157	1	94.157	578.474	<.001 ^b
	Residual	50.621	311	.163		

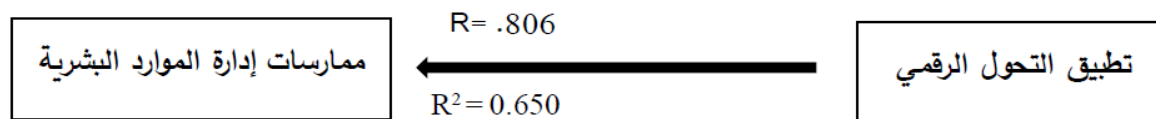
Total	144.778	312			
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a. Dependent Variable: ممارسات إدارة الموارد البشرية

b. Predictors: (Constant), تطبيق التحول الرقمي

Coefficients ^a							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.315	.152	2.077	.039	.017	.614
	تطبيق التحول الرقمي	.895	.037	.806	<.001	.822	.968

a. Dependent Variable: ممارسات إدارة الموارد البشرية



The tables above show the following:

Less than (0.01) which indicates the significance of (sig. F) which is (F) • The significance level of the simple linear regression model test at a significance level of 0.01

indicates a positive correlation between the application of digital transformation ($R = 0.806$) • The value of the correlation coefficient ($R = 0.806$) indicates that (65%) of the variance in human resource management practices (overall) can be explained by the variance in the level of application of digital transformation.

Whereas the significance level, (β) indicates the significance of the regression coefficient beta (T.Value) • The value of (t) calculated for the (t) test is less than (0.01)

Based on the previous results, the validity of the main hypothesis is accepted, which states that there is a positive correlation with statistical significance between the application of digital transformation as an independent variable and human resources management practices (overall) as a dependent variable.

Results of testing the first sub-hypothesis of the study:

This hypothesis states that: "There is a positive relationship with statistical significance between the application of digital transformation and the function of human resources planning. . " This hypothesis tests the direct relationships between the application of digital transformation under study as an independent variable, and the function of human resources management planning as a dependent variable.

Simple Linear Regression To test this hypothesis, the simple linear regression analysis method was used.

Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.764 ^a	.584	.582	.457

a. Predictors: (Constant), تطبيق_التحول_الرقمي

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	91.086	1	91.086	436.026	<.001 ^b
	Residual	64.968	311	.209		
	Total	156.053	312			

a. Dependent Variable: وظيفة تخطيط الموارد البشرية

b. Predictors: (Constant), تطبيق_التحول_الرقمي

Coefficients^a

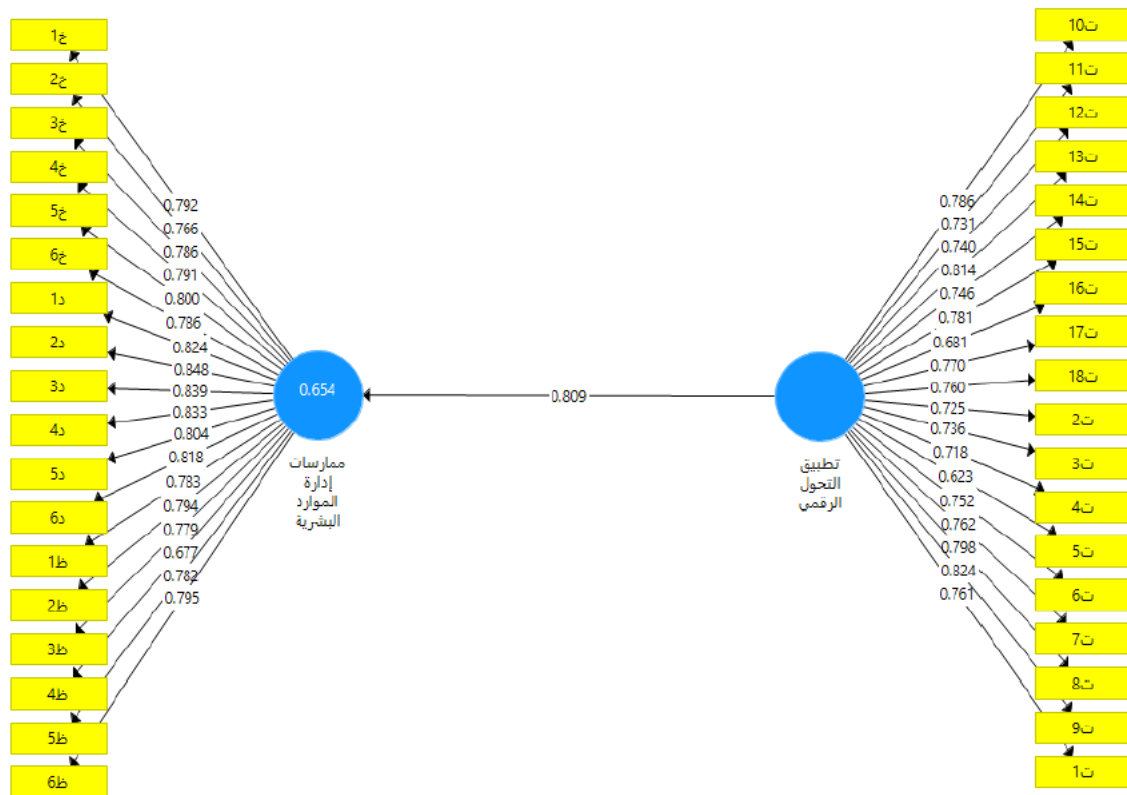
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.497	.172		2.889	.004	.158	.835
	تطبيق_التحول_الرقمي	.880	.042	.764	20.881	<.001	.797	.963

The study hypotheses were tested through the structural equation model, SPSS to confirm the results extracted from the Smart-PLS program using the statistical program 3.0 (Structural Equation Modeling).

The main hypothesis of the study:

- There is a positive relationship with statistical significance between the application of digital transformation and human resources management practices

in the Egyptian banking sector



العلاقة بين تطبيق التحول الرقمي وممارسات إدارة الموارد البشرية (إجمالاً) - SEM-PLS

R²- P-Value

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
ممارسات إدارة الموارد البشرية	0.654	0.659	0.047	14.051	0.000

Path analysis-تحليل المسار

	Original Sample (O)
تطبيق التحول الرقمي - ممارسات إدارة الموارد البشرية	0.809

It is clear from the tables above related to testing the main hypothesis of the study that:

- The variance in the independent variable (implementation of digital transformation) explains 65.4% of the variance resulting from the dependent variable

(human resources management practices "overall")

calculated greater than 1.96, which indicates the significance of the relationship. T - Value of

A is less than 0.001 P-Value - The relationship between the two variables is statistically significant, where the value of

B= - The relationship between the two variables is strongly positive, where the value is 0.809

According to the statistical results above: There is a positive relationship with statistical significance between the application of digital transformation and the practices of

human resources management in the Egyptian banking sector

From this main hypothesis, sub-hypotheses branch out as follows:

F1: There is a positive relationship with statistical significance between the application of digital transformation and the function of planning human resources

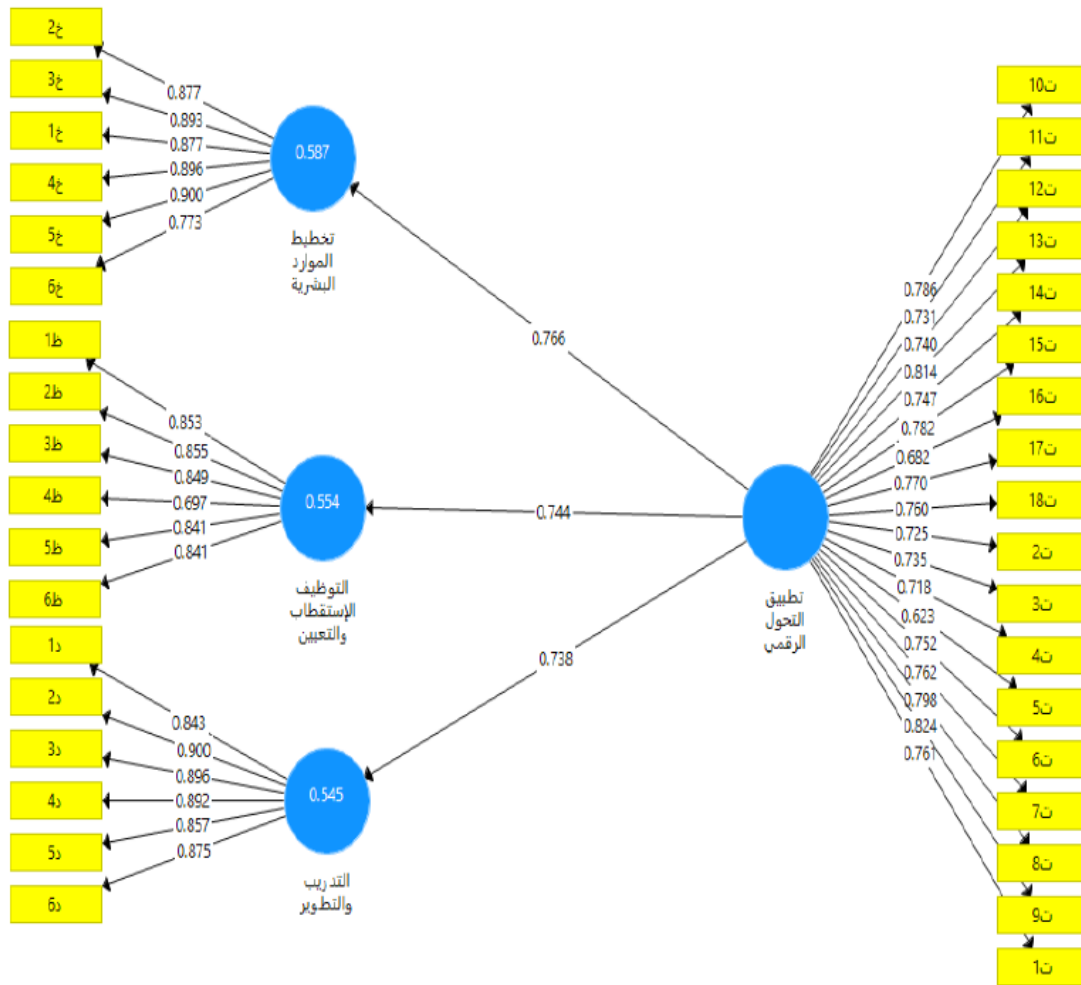
□

F2: There is a positive relationship with statistical significance between the application of transformation Digital and the recruitment function " □

Recruitment, selection and appointment".

Q3: There is a positive and statistically significant relationship between the application of digital transformation and the training and development function.

Which was tested through the structural equation model, as follows:



نموذج الدراسة - SEM-PLS

R²– P–Value

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
تخطيط_الموارد_البشرية	0.587	0.587	0.050	11.747	0.000
التوظيف_الإستقطاب_والتعيين	0.554	0.556	0.047	11.724	0.000
التدريب_والتطوير	0.545	0.548	0.043	12.795	0.000

Path analysis-تحليل المسار

	Original Sample (O)
تطبيق_التحول_الرقمي-> تخطيط_الموارد_البشرية	0.766
تطبيق_التحول_الرقمي-> التوظيف_الإستقطاب_والتعيين	0.744
تطبيق_التحول_الرقمي-> التدريب_والتطوير	0.738

It is clear from the tables above related to testing the main hypothesis of the study, that:

55.4,54.5% of the variance %, - The variance in the independent variable (digital transformation application) explains 58.7%

The result of the dependent variables (human resources planning, recruitment, training and development) respectively.

The calculated value is greater than 1.96, which indicates the significance of the relationship. T - Value

- The relationship between the independent variable (digital transformation application) and the dependent variables (human resources planning, recruitment, training and development) is statistically significant, where the value of

B= - The relationship between the digital transformation application and the human resources planning function is a strong positive, where the value of

B= - The relationship between the digital transformation application and the recruitment function "attraction and appointment" is strongly positive, where the value of

0.744

B= - The relationship between the digital transformation application and the Training is strongly positive, with a value of 0.738

According to the statistical results above: $\square$

There is a statistically significant positive relationship between the application of digital transformation and the human resources planning function. $\square$

There is a statistically significant positive relationship between the application of digital transformation and the recruitment function "attraction $\square$

and selection and appointment".

There is a statistically significant positive relationship between the application of digital transformation and the training and development function.

Abstract

SPSS V, for the statistical analysis of the data of the current study, both programs & 30 were used. The researcher conducted a descriptive analysis of the study sample, as well as a descriptive analysis of the variables of the study. According to the results of the statistical analysis of this study, the validity and reliability of the scales used in measuring the variables of the study were achieved. Also, the main hypothesis of the study and the three sub-hypotheses were proven.

the reviewer

Hair, J.F. Jr, Black, W.C., Babin, B.J. and Anderson, R.E. (2010), Multivariate Data Analysis: A

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Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L., (2006). Multivariate data

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Kaiser, H.F., (1974). An index of factorial simplicity. Psychometrika, 39(1), pp.31-36

الإحصاء الوصفي للعينة

		الجنس			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	ذكر	152	48.6	48.6	48.6
	أنثى	161	51.4	51.4	100.0
Total		313	100.0	100.0	

العمر

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	أقل من ٣٠ سنة	141	45.0	45.0	45.0
	من ٣٠ إلى ٤٠ سنة	76	24.3	24.3	69.3
	من ٤١ إلى ٥٠ سنة	51	16.3	16.3	85.6
	أكثر من ٥٠ سنة	45	14.4	14.4	100.0
	Total	313	100.0	100.0	

مستوى الخبرة

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	أقل من ٥ سنوات	135	43.1	43.1	43.1
	من ٥ إلى ١٠ سنوات	54	17.3	17.3	60.4
	من ١١ إلى ٢٠ سنة	49	15.7	15.7	76.0
	من ٢١ سنة فأكثر	75	24.0	24.0	100.0
	Total	313	100.0	100.0	

طبيعة العمل

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	قيادات	81	25.9	25.9	25.9
	موظفين	207	66.1	66.1	92.0
	تقنيين	25	8.0	8.0	100.0
	Total	313	100.0	100.0	

المستوى التعليمي

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ثانوي	2	.6	.6	.6
	جامعي	233	74.4	74.4	75.1
	دراسات عليا	78	24.9	24.9	100.0
	Total	313	100.0	100.0	

معاملات ارتباط كل عبارة بالدرجة الكلية للمقياس التابعة له

تطبيق التحول الرقمي	تخطيط الموارد البشرية	التوظيف الاستقطاب والتعيين	التدريب والتطوير	العبارات
0.761				ت ١
0.725				ت ٢
0.735				ت ٣
0.718				ت ٤
0.623				ت ٥
0.752				ت ٦
0.762				ت ٧
0.798				ت ٨
0.824				ت ٩
0.786				ت ١٠
0.731				ت ١١
0.740				ت ١٢
0.814				ت ١٣
0.747				ت ١٤
0.782				ت ١٥
0.682				ت ١٦
0.770				ت ١٧
0.760				ت ١٨
	0.877			خ ١
	0.877			خ ٢
	0.893			خ ٣
	0.896			خ ٤
	0.900			خ ٥
	0.773			خ ٦
			0.843	د ١
			0.900	د ٢
			0.896	د ٣
			0.892	د ٤
			0.857	د ٥

تطبيق التحول الرقمي	تخطيط الموارد البشرية	التوظيف الاستقطاب والتعيين	التدريب والتطوير	العبارات
			0.875	د ٦
		0.853		ظ ١
		0.855		ظ ٢
		0.849		ظ ٣
		0.697		ظ ٤
		0.841		ظ ٥
		0.841		ظ ٦