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The Role of ERP in Supply Chain Management A Comparative Study between Agricultural & Industrial Sectors

Rôle des PGI dans la Gestion de la Chaîne Logistique Étude Comparative entre le Secteur Agricole et le Secteur Industriel

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Abstract

In today's competitive fast-changing environment, businesses are compelled to adapt to meet customer demands and requirements. Widespread digitization of the economy reinforced use of new information and communication technologies within organizations. An effective supply chain results in enhanced financial and non-financial performance. Managers are, thus, increasingly convinced of information systems' major role in attaining organizational objectives. Our research study aims to explain how does ERP system affect SCM performance in the agricultural and industrial sectors. It also brings to light sector specificity and its impact on enhancing and/or reducing information system performance. A total of 30 semi-structured interviews were conducted, of which 19 in a Moroccan farm group and 11 in a Moroccan industrial holding. Findings from this study explain ERP's role in supply chain management in both sectors, and outline sector specificity's major impact on ERP performance. Further research should examine agricultural sector particularity in countries which have reached massive advancement in information and communication technology equipment and in modernized agriculture, notably Japan, Australia and China.

Keywords : Enterprise Resource Planning; Supply Chain Management; Sector Specificity; Agriculture; Industry.

Résumé

Sensibles à la compétitivité de l'environnement actuel, les organisations s'attachent à répondre rapidement aux exigences de leurs clients. La digitalisation étendue de l'économie a renforcé l'utilisation des nouvelles technologies de l'information et de la communication au sein des entreprises. Une chaîne logistique efficace et efficiente se traduit par des performances financières et non financières accrues. Dans ce sens, les managers sont de plus en plus convaincus du rôle majeur des systèmes d'information dans l'atteinte des objectifs organisationnels. Notre recherche vise à expliquer le rôle que jouent les progiciels de gestion intégrés dans la gestion de la chaîne logistique dans les secteurs agricole et industriel. Notre étude comparative met également en évidence la spécificité sectorielle et son impact sur l'amélioration et/ou la réduction des performances du système d'information. 30 entretiens semi-directifs ont été effectués, dont 19 au sein d'un groupe agricole marocain et 11 dans une holding industrielle marocaine. Les résultats de notre étude expliquent le rôle que jouent les PGI dans le renforcement de la performance logistique dans chaque secteur et soulignent l'impact des spécificités sectorielles sur l'amélioration et/ou la limitation de la performance du système d'information.

Mots clés: Progiciel de Gestion Intégré ; Gestion de la Chaîne Logistique ; Spécificité Sectorielle ; Agriculture ; Industrie.

Introduction

In order to maintain a lead on their competitors, organizations are compelled to provide products that meet customer's changing requirements in the fastest possible timeframe. An effective supply chain management enables businesses to acquire this competitive edge (Akey, 2020). With the rapid advancement of information technology, organizations are seeking alternatives to enhance their SCM performance. ERP system provides real-time monitoring and insights through internal process integration (Akbulut & Kelle, 2005). Implementing the appropriate ERP into the supply chain improves data accuracy and facilitates the decision-making process, due to transparent reporting (Mangaladurai & Nemati, 2013). "Time is money"; a saying that takes all its sense in the world of logistics. Now in a race against time, organizations must rapidly deliver their products and/or services to achieve long-term customer relationships. ERP system unites the chain partners (providers, suppliers, wholesalers, carriers, etc.), which eases the stream of information and material flaws and increases cooperation and coordination along the entire supply chain. Considering that number of supply chains which are non-integrated with ERP systems show poor business relationships and commercial loss (Mangaladurai & Nemati, 2013). ERP's implementation seems to bring far more benefit to SCM than damage. However, this statement is only valid for successful ERP adoption projects, which align with the organizations' activities and finances.

Agriculture and industry operate differently, but both constitute key sectors for Moroccan economy growth. The agricultural sector proved remarkably resistant to the health crisis, compared to other sectors. The policies carried out within the framework of the Green Morocco Plan (2008-2020) have succeeded in maintaining a significant supply of agricultural products, even during the lockdown (Bentaleb & Taki, 2021). However, increased water stress has become a structural problem for Moroccan farmers. In addition to the incest pest risk, the agricultural sector is suffering the consequences of the international gas crisis and nitrogen fertilizer shortage. Through financial incentives, the Ministry of Agriculture may motivate the cultivation of certain varieties over others. Nonetheless, farmers are entitled to choose plants to grow; thus complicating supply and demand forecast. Moreover, traders and middlemen widen a big gap between the actual product price and the end-price to consumers. These elements outline the agricultural sector's fragility to climate and market hazards. A sector which yet contributes 19% of GDP, employs more than 40% of the workforce and ensures rural stability. Industrial development is also a powerful engine for economic growth. The industrial sector

has seen significant development in recent years, as a consequence of the Plan for Industrial Acceleration (2014-2020). Despite increased competition, Morocco is among the most competitive countries, with investment incentives considerably lower than those offered by developed countries. The opening of new spinning mills has resulted in the rise of added value in the textile industry to 40%. Furthermore, the automotive sector generates over 180000 employments through its 250 factories, with a local integration rate of 63%.

Taking the current context into consideration, conducting a comparative study between agricultural and industrial sectors is of great interest to researchers and professionals, as it explains ERP role in SCM and brings to light sector specificity and its impact on enhancing and/or reducing information system performance. For this, we will try to answer the following questions: How does ERP system affect SCM performance in agricultural and industrial sectors? And, does sector specificity impact information system performance? Our research paper is structured as follows: First a literature review of ERP systems and supply chain management is presented. Second, the research model and hypothesis are developed. Third, the research methodology is addressed. Fourth, the empirical findings are discussed. At last, research implications and limitations are raised in the conclusion.

1. Literature Review

1.1. ERP Systems

ERP is an integrated system that collects all the internal resources of the company and executes effective planning and control (Schwenk, 2018). It aims to improve the information and logistics' management, through the use of information technology, as to integrate business functions, which are combined for better supply chain management (Fasghandis et al., 2017). ERP is an integrated information system for directing, controlling and monitoring projects, which allows companies operating in different sectors to hold knowledge (Gavali & Halder, 2020). Through the effective automation of business processes and data sharing, it allows the company to efficiently and effectively manage its resources (Laudon, J. & Laudon, K., 2014). ERP reduces the decision-making process because real-time data and reporting are available and accessible. In fact, business processes' integration with the supply and demand system, enhances resource optimization (Wei, C. L. & Wei, H. J., 2017). However, number of studies carried out showed a high failure rate of ERP implementation (Alenezi & Alsayat, 2018). The cost and maintenance of the system weighs heavily on the company's finances. And, customizing the business process requires a lot of time, expertise, and money. It is also

important to ensure the software's alignment with the company's activity. Panorama Consulting Group's study (Panorama Consulting Group, 2017) revealed that out of 342 ERP projects, 66% were late, 74% were over-budgeted and that 37% of projects achieved less than 50% of expected benefits. Thus, despite advanced information technology and prior research, further studies will help address the raised issues.

1.2. Supply Chain Management

Supply Chain Management is a "set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantity, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements" (Kaminsky et al., 2008). It covers suppliers, manufacturers, distributors, and retailers, which are linked by financial and information frameworks (Kürşat & Türker, 2020). According to Gupta et al. (2017), the major supply chain components are operation strategy, outsourcing strategy, channel strategy, customer service strategy and asset network. The operation strategy determines the plans for effectively using the company's resources to produce goods and/or services. The outsourcing strategy decides the value chain activities to contract out. Channel strategy defines the company's plan to sell and distribute its products (directly to customers, or indirectly through retailers/distributors). Customer service strategy aims to provide a service that meets customer expectations. And, asset network guides the overall asset management activities within an organization. Supply Chain Management covers all activities through which a finished product is obtained and delivered to the final customer (Huda et al., 2019). Coordination within the supply chain goes through three stages: integration of information, cooperation between partners and optimal coordination. At first, information flows are transversely shared among supply chain actors. In the second stage, both information and material flows are coordinated, following the chain partners enhanced cooperation. Finally, coordination becomes optimal, as the information, material and financial flows are shared and controlled among supply chain actors (Mangaladurai & Nemati, 2013).

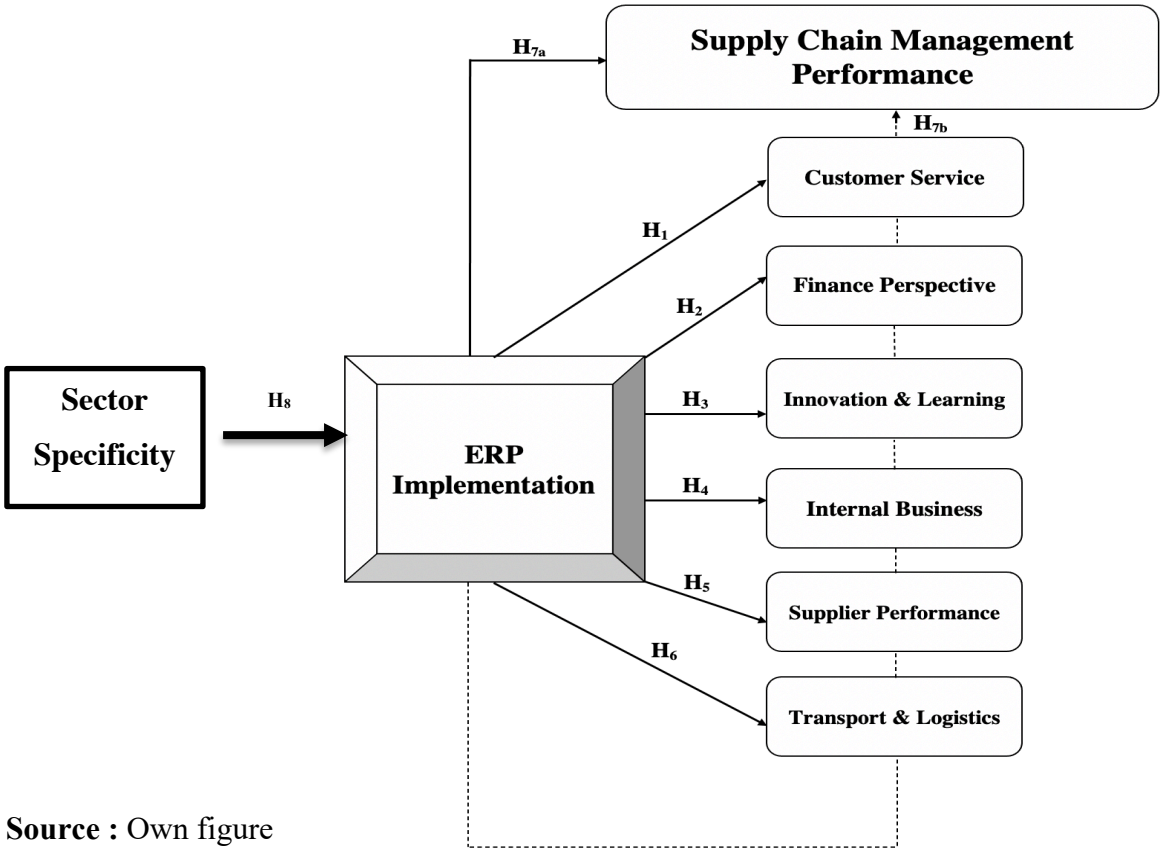
2. Research Model and Hypothesis

Prior research has examined the impact of ERP implementation on organizational performance, showing the information system's positive impact on financial indicators' improvement, notably the return on investment and the turnover (Hunton et al., 2003). It has also been demonstrated that ERP systems enhance supplier performance, through reducing order cycle

times (Bendoly et al., 2006). The results from the exploratory study conducted with 23 executives of European multinationals showed a modest role for ERP improving future supply chain effectiveness. The Delphi study found that ERP's implementation leads to better product and services' customization, more standardized processes and greater transparency (Akkermans et al., 2003). Shatat and Udin (2012) demonstrated that ERP's operational functions highly affect internal and external SCM business processes. In fact, the study found that ERP's implementation contributes to the enhancement of customer service and cost management. In today's world of globalization and fierce rivalry, organizations seek to increase performance and gain the competitive edge. Enhancing coordination and information sharing among partners are the keys to successfully manage the supply chain; thus the importance of investing in IT (Colin et al., 2015; Han et al., 2017 and Obeidat & Otibi, 2015). Han et al. (2017) claim the existence of a strong relationship between the use of information technology and supply chain performance. Moreover, De Camargo Fiorini and Jabour (2017) consider it to be impossible for organizations to achieve an effective and efficient supply chain without the use of information technology. Information systems are significant and integral parts of businesses and of their supply chains (Karaganis et al., 2021). For an effective supply chain management, process integration is critical (Flynn et al., 2010; Huo et al., 2014 and Karaganis et al., 2021) which could be enabled by streamlining the organizations' functions through information systems such as ERP. Hence, IT implementation improves supply chain performance (Awaain et al., 2020). According to Jenatabadi et al. (Binti et al., 2013), SCM is both directly and indirectly positively affected by ERP; the information system is considered to significantly increase supply chain management capability. Binti et al. (2013) also confirm ERP's mostly indirect impact on organizational performance, through supply chain management. Bottani and Bigliardi (2014) carried out a systematic review of the literature related to supply chain performance measurement, resulting in the identification of a set metrics (customer service metrics, financial metrics, innovation & learning metrics, internal business metrics, supplier performance metrics, transport & logistics metrics) which are used to evaluate SCM performance following ERP implementation. The existence of a significant relationship between ERP systems and supply chain management having been discussed in the literature, our research attempts to investigate the role of ERP's implementation on supply chain management performance in the Moroccan context. Based on the above, our research hypothesis and model (Figure 1) have been established:

- H_1: ERP system will enhance Customer Service
- H_2 : ERP system will enhance Financial Perspective
- H_3: ERP system will enhance Innovation & Learning
- H_4: ERP system will enhance Internal Business
- H_5: ERP system will enhance Supplier Performance
- H_6: ERP system will enhance Transport & Logistics
- H_{7a}: ERP system will directly enhance SCM performance
- H_{7b}: ERP system will indirectly enhance SCM performance
- H_8 : Sector specificity impacts ERP performance

Figure N°1 : The proposed research model



Source : Own figure

3. Research Methodology

While quantitative research seeks to answer the "why" question, the qualitative research focuses on the "how" or the "what" (Harling, 2013). Through our research questions - How does ERP system affect SCM performance in agricultural and industrial sectors? And, does sector

specificity impact information system performance? - we seek to understand EPR role in SCM and bring to light sector specificity and its impact on information system performance. Hence, in order to evaluate the conceptual framework, case study research has been designed. The case study method is a form of qualitative analysis, which investigates the research object in depth through the use of small samples, entailing data generalizations and inferences (Kothari, 2004). The researcher aims to understand the behavior pattern of the investigated object as to explain the causal link established between variables (Kothari, 2004). There are two types of case studies; single cases or multiples cases (Harling, 2013). In our paper, we chose the multiple case study and especially the instrumental one, as to provide a general understanding of ERP's role on supply chain management performance. Data were collected via 45 minutes to one-hour semi-structured interviews of about 15 open-ended questions where the interviewees were asked to rank the improvement of SCM performance indicators post ERP implementation using a seven-point-Likert scale, as shown in Figure 2 (Bentaleb & Taki, 2021). It should be underlined that, on one hand, we studied the case of a Moroccan farm group, and on the other hand, the case of a Moroccan industrial holding company. Both organizations contain multiple firms (7 for the farm group and 9 for the industrial holding) and have successfully implemented an ERP system for longer than 3 years, reasons for which they were selected. Theoretical saturation has been reached at 19 interviews in the farm group and 11 interviews in the industrial holding. The results will be compared and interpreted taking into account the challenges encountered in each line of business.

Figure N°2 : SCM performance impact scale

1	High Performance Reduction	**4**	No Effect on Performance	**5**	Low Performance Improvement
2	Medium Performance Reduction			**6**	Medium Performance Improvement
3	Low Performance Reduction			**7**	High Performance Improvement

Source : *Own figure*

Regarding the farm group, 10 semi-structured interviews were carried out back in 2021, which enabled an initial draw of conclusions. In March 2022, we reconducted 19 semi-structured interviews with the head of the group, the director of sales and marketing, the development director, the administrative & financial manager, the group management controller, the agronomist, the manager (5) and the supervisor (8) of each agricultural domain. The group uses Bee One ERP since 2018; a solution exclusively designed for farm management (Bentaleb & Taki, 2021) to manage its citrus-growing fields -oranges & mandarins- of 1195 hectares. As for

the industrial holding, it operates in multiple activity sectors, including construction industry and urban planning (production of precast concrete and prestressed floors, pellet production, general building works), transport and logistics (rental of lifting and handling equipment, transport of goods) and real estate (economic housing, average and high standing). The initial discussion on ERP's adoption started in 2005 and required four years for the information system to be successfully implemented. Staff training was conducted in 2013 and the holding is currently upgrading its Sage X3 system to the 12th version. In February 2022, we conducted 11 interviews with the Chief Executive Officer *(CEO)*, the Chief Financial Officer *(CFO)*, the Chief Commercial Officer *(CCO),* the Chief Information Officer *(CIO),* the Technical Director, the Human Resources Director, the management controller, the accounting and administration manager, the purchasing manager, the quality manager and the automation & process engineer.

4. Results and discussion

A Shapiro-Wilk's test (p> .05) and a visual inspection of their histograms, normal Q-Q plots and box plots showed that the performance indicators were approximately normally distributed; the skewness z-value and kurtosis z-value ranging between -1,96 and +1,96 (Bentaleb et al.) . Also, Cronbach's Alpha test results show good consistency reliability. Hence, the collected data is consistent and entails us to confirm or reject our research hypothesis. Out of 40 SCM metrics, only 29 indicators show a performance improvement (mean>4) in the farm business, contrary to the industrial holding, wherein all 40 indicators showed a medium to high performance improvement (mean>6). The results are thoroughly analyzed below.

4.1. Customer Service (CS)

Table N°1 : Role of ERP in Customer Service

Perspective	SCM's performance indicators		Mean 2022	
			Farm Group	Industrial Holding
Customer Service (CS)	CS1	Delivery timeliness	4,11	6,26
	CS2	Delivery frequency	4,05	5,95
	CS3	Response time to customer queries	4,16	6,42
	CS4	Order compliance	4,21	6,32
	CS5	Service quality	6,16	6,58
	CS6	Product quality	5,16	6,53
	CS7	Product value perceived by the customer	4,00	5,89
	Indicator Average		**4,55**	**6,28**

Source : *Own table*

Regarding Customer Service metrics (Table 1), they show a low performance improvement in the farm business as the indicator average ranges between 4,01 and 5,00, in contrast to a high-performance improvement in the industrial holding, where the indicator average exceeds 6,01. This can be explained by the particularity of the customer relationship in the agricultural sector, which can take two main forms: Aggregation and/or Business-to-Business. In the first case, the farm business – the aggregate – concludes a consignment agreement with the aggregator. The aggregate is in charge of producing the intended through seed supply, seed plantation and harvest, while the aggregator handles the downstream of the commercial chain, notably packaging and oversea transportation. The consignment agreement is concluded six months prior to harvest which enables the aggregate to focus on the agricultural chain upstream and entails the aggregator to develop its sales target and program at ease. In the second case, the farm business sells its products directly to another business, either before the agricultural season when the seed is yet being planted, or when the product is ready for harvest. Both parties agree on the start and finish date of harvesting. Demand forecast is a decisive factor in choosing whether to sell at a lower price in advance, or whether to sell at harvest for a higher price. Climate hazards *(such as droughts and lack of rainfall)* and market hazards *(e.g. the current international gas crisis)* hinder the effective functioning of farm businesses, which results in serious un-intended consequences. Getting fully paid at the start, or waiting until harvest for an additional margin : a decision that requires major risk assessment. The two forms of customer relationship in agricultural sector are established on the basis of direct contact and physical presence. The customers multiply the number of visits to ensure the efficient running and to monitor production progress. This explains the low performance improvement of delivery timeliness and frequency, response time to customer queries and order compliance, following Bee One implementation. As for product quality (mean>5) and service quality (mean>6), the interviewees acknowledge the indirect role of ERP in enhancing product and service quality, through information availability and accessibility, data accuracy and practicality of management control tools, which are adapted to the agricultural sector.

As for the industrial holding, all Customer Service indicators show a medium-to-high performance improvement. Information systems were initially developed for large industrial businesses, which are kaizen & lean oriented. These organizations resort to cost control and automation in order to further enhance performance. Customer relationship in the industrial sector is based on regular high-level interaction through indirect and virtual communication.

The integrated database provides easy and fast access to customer information and preferences. In addition, customer requests and failures are rapidly processed, which enhances response time performance and time-to-resolution. Moreover, the information system's cross-functional ability enables personalized customer service. ERP also allows order tracking and provides an efficient aftersales service, which reinforces customer satisfaction. The software features allow meeting customer requirements and responding to their needs in a less burdensome and time-consuming way *(CS1, CS2, CS3, and CS4)*. The organization is, consequently, capable of delivering higher quality products and better service quality, which positively impacts product value as perceived by customers *(CS5, CS6 and CS7)*. Considering the above, Sage X3 system is considered to have a direct effect on Customer Service within the Moroccan industrial holding.

4.2. Financial Perspective

Table N°2 : Role of ERP in Financial Perspective

Perspective	SCM's performance indicators		Mean 2022	
			Farm Group	Industrial Holding
Financial Perspective (FP)	**FP1**	Deviation from budget	6,26	6,21
	FP2	Operating and administration costs	6,37	6,53
	FP3	IT operating costs	6,95	6,32
	FP4	Cashflow	6,47	6,74
	FP5	Return on Investments (ROI)	6,42	6,21
	FP6	Return on Assets (ROA)	6,74	6,26
	FP7	Earned Value Added (EVA)	6,16	6,47
	Indicator Average		**6,48**	**6,39**

Source : *Own table*

Financial Perspective (Table 2) shows high-performance improvement in both sectors. In fact, farm group and industrial holding interviewees agree on the beneficial role of using ERP. On one hand, it gathers all information and provides tools to process the input data, which facilitates decision-making. On the other hand, the software enables real-time access to highly accurate information and limits the involvement of manual data manipulation. It should be noted that reducing human intervention improves task efficiency and facilitates error finding. ERP system integrates the organizations' business processes and sub-processes, which entails information to be carried out in a cross sectional and transversal manner. Also, the use of reporting features and follow-up indicators enhances cash and financial management. For an example, if the

electricity consumption ratio *(easily calculated through ERP)* constitutes a significant burden, it can lead the farm business to initiate the thought process on investing in solar energy. A decision which could be rapidly made, as the financial statements and any additional information needed, are available at the click of a mouse. In addition, assuming that fertilizers' consumption doubles during the same period compared to the past year, the system produces an alert in which the irregularity is highlighted. Moreover, comparing cost evolution between production plants or between agricultural parcels and sites allows effective cost monitoring. Considering the above, it seems that ERP has a direct and positive impact on financial SCM indicators, resulting in their enhancement within the farm group and the industrial holding.

4.3. Innovation and Learning

Table N°3 : Role of ERP in Innovation and Learning

Perspective	SCM's performance indicators		Mean 2022	
			Farm Group	Industrial Holding
Innovation & Learning (IL)	**IL1**	New products developed per year	4,00	6,68
	IL2	Time for new product development	4,00	6,84
	IL3	Product modifications in response to customer's requests	6,68	6,74
	IL4	Number of process innovation developed per year	6,32	6,26
	IL5	Workforce flexibility	6,11	6,47
	IL6	Information sharing along the supply chain	6,84	6,79
	Indicator Average		**5,66**	**6,63**

Source : *Own table*

Regarding Innovation & Learning (Table 3), ERP plays a major role in industrial product development, as the R&D department can directly configure the material bill into the system. The software package identifies the material needed for manufacturing the desired product, and determines whether it's available in stock. If not, the information system calculates the exact amounts required, resulting in a substantial saving of time. This explains the indicators' high-performance improvement *(IL1, IL2, IL3 and IL4)*. The procedure is different in the case of agricultural product development. An agreement is concluded between the farm business and a plan nursery one year prior to the set delivery date, as the ordered varieties need to undergo seed multiplication. Here, ERP doesn't interfere in citrus variety development, nor does it affect the process efficiency *(IL1 and IL2)*. However, ERP helps the agricultural business reach customer requirements regarding product modifications *(fruit caliper, color, density, etc.)*, via

relevant data analysis. Bee One ERP also entails all its clients to take part in the continuous process improvement, through the know-how and expertise sharing. In fact, once a shortfall and/or deficiency are detected *(e.g. demanding water consumption integration or need for a specific technical ratio)*, they are reported to the software company. Depending on the urgency, the problem is either immediately fixed or subsequently handled *(IL4).* Finally, enhanced workforce flexibility and information sharing along the supply chain are obvious consequences of successful ERP project adoption in both sectors *(IL5 and IL6).* ERP system is considered to affect Innovation and Leaning directly within the industrial holding and mostly indirectly within the farm group.

4.4. Internal Business

Table N°4 : Role of ERP in Internal Business

Perspective	SCM's performance indicators		Mean 2022	
			Farm Group	Industrial Holding
Internal Business (IB)	**IB1**	Workforce productivity	6,11	6,89
	IB2	Effectiveness of production planning techniques	6,68	6,79
	IB3	Resource utilization	6,74	6,68
	IB4	Accuracy in forecasting demand	4,00	6,84
	IB5	Production errors	6,21	6,32
	IB6	Amount of production waste	5,42	6,63
	IB7	Business processes	6,16	6,79
	IB8	Data processing time	6,89	6,95
	IB9	Internal information sharing	6,63	6,89
	IB10	Decision-making	6,74	6,89
	Indicator Average		**6,16**	**6,77**

Source : *Own table*

Internal Business metrics (Table 4) reached an overall high-performance improvement in both sectors. Manual and repetitive tasks cause valuable time and energy loss. Software features enable process integration and automation, resulting in workforce productivity reinforcement *(IB1)*. The project management module offers important tools for flexible and efficient industrial production planning. It should be stressed that the holding uses a Business Intelligence software to extract information from Sage X3. In addition, ERP gathers customer transaction data which improves demand forecasting accuracy *(IB4),* contrary to the farm group wherein the information system doesn't affect demand forecasting as the relationship with

customers is different in the agricultural sector. In addition, the technical conduct module provides effective planning techniques, which are adapted to the activity peculiarity. For instance, the way or the manner trees are trimmed post-harvest is examined to determine whether or not it has an impact on product quality, caliber, color, etc. The weather station is also connected to the module, which gives better insights for accurate operational forecasting. ERP's ability to streamline business processes entails significant cost reduction and timesaving *(IB7 and IB8)*. The integrated information and processes lead to resource use optimization, and reduce -if not eliminate- production errors, limiting by that production waste *(IB3, IB5, IB6, and IB7)*. The accurate data availability and accessibility reinforce transversal information sharing among the organization and lead to effective and efficient decision-making *(IB9 and IB10)*. ERP implementation is considered to have a direct role in Internal Business within both organizations.

4.5. Supplier Performance

Table N°5 : Role of ERP in Supplier Performance

Perspective	SCM's performance indicators		Mean 2022	
			Farm Group	Industrial Holding
Supplier Performance (SP)	SP1	Efficiency	4,00	6,00
	SP2	Response time	4,00	6,32
	SP3	Reliability	4,00	6,53
	SP4	Price offered	4,00	6,68
	Indicator Average		**4,00**	**6,38**

Source : *Own table*

Use of ERP system in the farm group doesn't affect Supplier Performance (Table 5), as the indicators' performance improvement remain unchanged (mean=4). On one hand, the best quality plant-protection products are exclusively distributed by one supplier, thus benefiting from full leverage. On the other hand, the remaining needed materials are bought from resellers. Here, climate and market hazards play a major role in regulating bargaining power over suppliers. The ongoing nitrogen fertilizer shortage has limited the group's negotiating capacity, because demand is outstripping supply. The farm group is also facing gas price rise since covid19; which has been further aggravated by the Russia-Ukraine war. Therefore, Bee One has no direct impact on supplier performance. The industrial holding shows high supplier performance improvement (mean>6). ERP tools enhance inventory shortage forecasting, which entails better management of supply disruptions. Access to suppliers' history and business

information also allows the holding to compare its suppliers, and to choose the one who meet the best high quality-good price performance ratio requirements. To sum up, the information system is considered to have no effect on Supplier Performance within the farm group, contrarily to the industrial firm, wherein ERP implementation has a direct impact on all Supplier Performance metrics.

4.6. Transport and Logistics

Table N°6 : Role of ERP in Transport and Logistics

Perspective	SCM's performance indicators		Mean 2022	
			Farm Group	Industrial Holding
Transport & logistics (TL)	TP1	Stock turnover	4,00	6,26
	TP2	Cost of inventory management	4,00	6,63
	TP3	Warehouse Management cost	4,00	6,37
	TP4	Total supply chain cost	6,37	6,79
	TP5	Cost per product unit	6,26	6,47
	TP6	Costs of Information Technology	6,42	6,05
	Indicator Average		**5,18**	**6,43**

Source : *Own table*

As stated previously, the farm group focuses on the chain upstream, while the customer is responsible for transporting the citrus fruit on the same day they're picked from trees and put in crates. Hence, the costs incurred to store, package and transport the goods are supported by the client and not by the agricultural business *(TP1, TP2 and TP3)*. However, in the case of the industrial holding, ERP plays a major role in enhancing inventory management. The holding has numerous daily business transactions, resulting in intensified physical stock movement. Data accuracy and availability entail efficient and cross-functional information sharing and cooperation among the supply chain, resulting in better inventory management, process effectiveness and cost-efficiency *(TP4 and TP5)*. Both organizations estimate IT expenses to be reasonable when compared to the flow of benefits it generates *(TP6)*. ERP system is considered to impact Transport & Logistics metrics' performance indirectly within the farm group and directly in the industrial holding.

Conclusion

The research sets out to advance an understanding of ERP role in supply chain management within the agricultural and the industrial sectors. The results affirm that ERP positively affects

SCM performance in the industrial holding, as all 40 metrics show a medium to high performance improvement, contrarily to the farm group, wherein ERP has no effect on 11 SCM performance indicators. Study findings enable us to validate or reject our research hypothesis (Table 7). ERP indirectly enhances SCM performance in the farm group, through data accessibility and availability, the integration of business processes and the transversal information sharing. However, considering the agri-sector specificity, confirming or rejecting the information system's direct positive impact on SCM, requires further analysis. Our comparative study brings to light the impact of sector specificity on enhancing and/or limiting information system performance. For instance, the customer relationship in the agricultural sector is established on the basis of direct contact and physical presence, whereas in the industrial sector, it is based on regular high-level interaction through indirect and virtual communication. The particularity of customer relationship in the agricultural sector limits ERP's impact on customer service and, thus, on SCM performance. Important questions arise: Are these limits solely encountered in Moroccan farm businesses? And, are climate and market hazards more threatening in Northern African countries? Another point to be raised is the high-level automation and cost control detected in the industrial holding. The very nature of the industrial sector enhances ERP's efficiency, as most – if not all – activities and processes are automated.

Table N°7 : Research hypothesis

Research hypothesis		Farm Group		Industrial Holding
H_1	ERP system enhances Customer Service	Confirmed	Indirectly	Confirmed
H_2	ERP system enhances Financial Perspective	Confirmed		
H_3	ERP system enhances Innovation & Learning	Confirmed	Indirectly	Confirmed
H_4	ERP system enhances Internal Business	Confirmed		
H_5	ERP system enhances Supplier Performance	Rejected		Confirmed
H_6	ERP system enhances Transport & Logistics	Confirmed	Indirectly	Confirmed
H_{7a}	ERP system directly enhances SCM performance	Further research is required		Confirmed
H_{7b}	ERP system indirectly enhances SCM performance	Confirmed		Confirmed
H_8	Sector specificity impacts ERP performance	Confirmed Limits ERP performance		Confirmed Enhances ERP performance

Source : *Own table*

Throughout our research, we attempted to explain **how** does ERP system affect SCM performance stressing each sector's distinctive features and providing concrete and up-to-date examples. The most significant ERP impact is shown in the industrial holding; in accordance with prior research that mainly addresses ERP's role in the industrial sector (Akkermans et al., 2003; Shatat & Udin, 2012; Colin et al., 2015; Obeidat & Otibi, 2015; Han et al., 2017; Jentabadi et al., 2013 and Jabour et al., 2017). To the best of our knowledge, no comparable contribution exists. These findings are of great interest for agri-sector researchers and professionals, as they pioneeringly bring to light sector specificity, thus opening new research horizons and possible remedies for the stated limitations. Further research should examine to what extent does agri-sector specificity limits information system performance, this time, conducting a comparative study between Moroccan and Japanese farm businesses, as they have reached massive advancement in ICT equipment and modernized agriculture.

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