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THE PROJECT MANAGEMENT APPROACH. A CRITICAL SUCCESS FACTOR IN DIGITAL TRANSFORMATION INITIATIVES

Sofia Carujo [1], Pedro Fernandes Anunciação[2], João Rocha Santos[3]

[1]*Plátano Editora, Corroios, Portugal, scarujo@hotmail.com*

[2]*Research Center in Business Sciences, Setúbal, Portugal, joao.rocha.santos@esce.ips.pt*

[3]*Research Center in Business Sciences, Setúbal, Portugal, pedro.anunciacao@esce.ips.pt*

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Abstract

Research purpose. The main objective of this work is to highlight the adoption of project management practices in companies' digital transformation initiatives as a critical success factor. Thus, on the one hand, we will seek to systematize the importance of project management practices in the digital transformation of economic organizations and, on the other hand, analyze them based on a digital transformation project of one of the largest publishing groups in Portugal. Having previously studied the process of digital transformation of the warehouse through the adoption of a Warehouse Management System, it is now important to analyze to what extent the transformation process was successful and to what extent the management as a project contributed to the achievement of the intended objectives and generated economic value.

Design / Methodology / Approach. The first part of the study was carried out through surveys to managers for a general characterization; the second part through the adoption of the focus group technique for analysis and study in greater depth of a case study. In the first phase, the focus group adopts semi-structured interviews with the different managers of the group's different companies and respective departments. In the second phase, a joint reflection on the organizational and economic value creation was developed based on the different existing perspectives of the digital transformation project. This reflection allowed a more objective analysis of the results obtained, the adequacy of management options, and the deviations.

Findings. Technologies analysis investment is a management principle, and the project management approach facilitates this practice. It is essential to carry out a careful project management approach and analyze the economic and financial viability of the investment. The disruptive changes associated with digital transformation make it difficult, and it is not easy to achieve the strategic objectives associated with these investments. So, the adoption of a project management approach seems to be critical for the success of the implementation of digital transformation initiatives. The current study highlights three critical aspects in the global assessment of IST investment: the importance of analyzing the objectives achieved; the importance of economic and financial analysis in determining the return on investment; and the relevance of the analysis being carried out by the stakeholders involved as a way of perceiving, individually and collectively, the diversity of the benefits achieved.

Originality / Value / Practical implications. The digital transformation of companies is a current reality and justifies a project approach to guarantee success in economic and organizational initiatives. However, it is important to analyze how management adopts the associated practices and whether it is aware of the importance of evaluating the intended results.

Keywords: Project Management; Economic value; Digital Transformation; Warehouse Management System; Information Systems; Warehouse Management

JEL codes: M1; M15

Introduction

Digital transformation is all around us (McCausland, 2021). Integrating a digital dimension into the "DNA" ("Deoxyribonucleic acid") business model or organizational functioning becomes a sustainability management issue. The change in economy and society is not stoppable but can be

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managed (Kleinert, 2021). We need to focus on enhancing elements that help us foster development (Martins, 2019). Digital transformation has become a critical management issue because it requires new ways of managerial thinking (Hassani, El Idrissi & Abouabdellah, 2018). Every organization and every innovation, including digital transformation, must be based on projects (Tommasi, 2018).

Digital transformation must correspond to a strategic purpose insofar as technological innovation and society's prompt adherence to information technologies put pressure on economic organizations for new digital positioning (Esteves & Anunciação, 2021). It is, therefore, an economic and organizational challenge with impacts on the level of sustainability (Anunciação, 2014). Project management is governed by specific management methodologies, standards, and other regulatory requirements (Berzisa & Grabis, 2009). In this sense, it must be properly planned, managed, and controlled (Choi & Ha, 2021). Digital transformation projects integrate a gradual movement that must be built and strengthened.

For this reason, projects in this area must be properly framed, analyzed, and managed to ensure the viability of digital transformation investments and the effective generation of value for their stakeholders. This need requires, from the managers, redoubled attention. The way to guarantee the success of any investment is to associate it with the development of a good project (Miguel, 2015). Projects should include the economic and financial viability analysis, the respective plan for operationalization and management, and the associated change management. Information systems and technologies (IST) project performance is defined by task, psychological, and organizational outcomes (Aladwani, 2002).

Given the complex nature of digital transformation, companies must frame the new reality in the different domains (strategic, organizational, and operational) (Esteves & Anunciação, 2021). So, the associated framework must include the diversity of the different natures, such as the development of digital products and services, the opening of new channels, the adoption of new operating cycles, the development of new skills and capabilities of human capital, the architecture of information systems, among other dimensions. This is one reason why IST projects are often complex and should be carefully managed, considering the various aspects that influence their success (Goncalves, Oliveira & Varajão, 2018).

Investments and IST projects are, in general, special projects and have some characteristics; namely, they imply continuous changes, involve people with different knowledge, provide multiple stakeholders' views of reality, are difficult to assess productivity, cover different areas of economic activity, require permanent updating of knowledge and techniques by the teams, among other characteristics (Miguel, 2019) (Miguel, 2015).

The investment in IST is a necessary condition for achieving greater levels of efficiency and competitiveness. However, it is not a sufficient condition insofar as project managers must administrate the various resources inherent to the nature of the investment itself (Oliveira, 2004). Therefore, it is important that managers are aware of this reality and assume the complementarity between investments and projects.

In the case studied, we sought to analyze how a warehousing project was planned, managed, and evaluated. It is the project management that allows investment operationalization and constitutes a roadmap to achieve the defined objectives. The need to increase the levels of efficiency and effectiveness, the improvement of flexibility in distribution, and the real-time response to economic dynamics, among other examples, justify the management's need to evaluate the project and the investment made. The evaluation of investments in digital transformation is not limited to a financial perspective or new performance management. However, it can probably include a decision to transform the company's operating modus operandi. The study presented here aimed to analyze the success of an investment in a digital transformation project of a group of companies in the publishing sector, highlighting the criticality of the adoption of instruments associated with project management, as well as the evaluation of predefined results. For this, the focus group technique was adopted, having integrated the different managers responsible for the different departments of the group of companies studied. With this methodology, we sought, through an int analysis, to analyze the adequacy of the instruments adopted and the results achieved.

From investment to project management

In digital transformation investments, we can find two distinct natures of projects (Esteves & Anunciação, 2021). The first refers to investment planning, management, and control. The second is related to change management. The project associated with the investment has a set of essential conditions for the success that must be observed, namely, the delimitation of the scope, the existence of an execution deadline, a definition of a budget, and the constitution of a team, among other things (Miguel, 2019). Regarding change, it is crucial to know the current situation (As-Is), to understand the starting point, to identify the future situation (To-Be), and to facilitate the definition of a roadmap to reach the objectives and preparation of the company for a new form of operation. In the digital transformation, the organizations face a radically changing context for their workforce, their workplace, and the organizational dynamics in general. So, it is critical to understand the context of this transformation (Lousa & Lousa, 2018).

As mentioned by Miguel (2015), investment projects associated with IST should focus on four important dimensions for a close relationship with a strategic plan:

- Analysis of the economic organization and its business strategy – should provide a clear view of strategic business units, key business processes, contribution to performance, and competitive advantages, among others;
- The assessment of the opportunity of new IST – must be based on the identification of competitors' activities on relevant technological trends, among others;
- Planning the IST strategy – should provide the identification of technological platforms, organizational implications, development problems, technical integration, and financial justification, among others;
- The implementation of IST – must be based on current architectures of the IST, areas of improvement, technical or business limitations, potential opportunities, defined strategy, and priority of the project, among other aspects.

Considering the complexity of digital projects regarding the high level of uncertainty, the only way to proceed is to use extreme caution and a refined sense of management. These are high-risk projects and should not be underestimated no matter how great the experience of those who lead them (Denic et al., 2014). Managers should pay particular attention to certain critical success factors, such as estimation, adjustments, and commitments. These critical factors are essential, especially for those who have responsibilities in the project leadership, and the respective nature can be specified as follow:

- Estimation – the effective estimation of the effort (resources and deadlines) and cost of technological solutions does not seem easy, being important for the project framework;
- Adjustments – estimates made at the beginning of the project are not as accurate as estimates made later;
- Commitments – Assuming commitments depends on understanding the size and nature of the project as well as the reliability of the estimates made.

It is important to make it clear that, despite the importance of the critical factors mentioned above, there is a central element that conditions all other factors and even the development of the project: the scope. Often through the scope, we can understand the existing problems that are sought to be solved with the investment. Also, in an investment in a warehouse management system (WMS), as in other projects, the delimitation of the scope and objective associated with the respective investment, which may be related, are very important; for example, to the existence of differences between inventories and physical stocks; the identification of the different resources, namely technological, for the implementation, for example, of a wireless network that covers the entire company; the period foreseen for the respective execution, for example, to communicate to the client’s new deadlines and delivery facilities; among other aspects.

The project evaluation must be based on the achievement of the defined objectives, allowing to determine to what extent the estimated benefits were generated. The success of a project depends on the fulfillment of objectives, the achievement of benefits, and the adequate adaptation to the new reality.

Methodology

Even though many studies found in the literature show results of software development projects, few studies address the success (socio-technical) of IST projects (Varajão et al., 2021). Considering this reality, based on the case study presented at ECTCH 2021, this study aims to analyze the success of the IST project associated with the viability of a strategic investment related to the digital transformation of the publishing warehouses' group case study. Whoever, this strategic decision must be followed by other management practices to control and assess the results of the investment. So, it is also the development of a parallel economic and financial analysis, the project management, and the change management that allows guaranteeing the investment success. In this sense, the project management, the project development assessment, as well as the change management are critical factors to achieving the expected results.

To fulfill the main objective of the present research work, to analyze the adoption of principles associated with project management throughout the investment cycle associated with the digital transformation, the research methodology was based on four central stages; namely, the assessment of investment viability study realized; the analysis of project management practices adopted; identification of change management practices adoption; and, finally, the assessment of the global results obtained.

To carry out this analysis, the focus group technique was adopted (Queirós & Lacerda, 2013) (Berg, 2001) (Morgan, 1996). All the experts involved in the previous study carried out in 2021 were invited. In this focus group, all the managers of the different departments of all group companies and top management participated. Confronted the focus group elements with the relevance of this new study proposal, in the continuation of the previous one, the availability and interest of participation and the opportunity to discuss the global results were evident.

The main mission of the focus group was to analyze and confirm the achievement of investment predicted results, the adequacy of project management practices, and the assessment of achievement of the defined objectives.

The focus group held several meetings to obtain a global consensus about the results of each dimension of the project management approach. That approach was centralized in the following central management factors: aim and objectives investment specification; viability of the investment; identification of the nature and associated costs; focus on the critical elements associated with project management (such as budget, period of life, …); risks project identification; benefits expected with the investment; and the technical and functional characteristics of IST.

It was considered that the participation of the same experts in this new study would allow a better assessment of the relevance of the investment in the digital transformation process, providing a more complete and rigorous analysis of the investment made and how the associated project was developed. This opportunity constituted a significant feedback opportunity for an individual and collective assessment of the value generated by the previously validated strategic decision. The methodology followed included several sequential meetings where each of the dimensions present in the previously mentioned phases was analyzed and evaluated.

Analysis of the case study

Recalling the case study presented is an editorial group composed of three publishers that operate in two business areas: school editions and general editions. The editorial group started the investment analysis of a WMS as part of the digital transformation strategy. The relevance and need for a WMS to support distribution and reverse logistics activities and the assumption of e-commerce as a vital commercial channel were considered critical for the company’s sustainability. The results of the first phase can be summarized as follows (Carujo, Anunciação & Santos, 2021):

- Starting assumptions: inventory was assumed as an important asset in the activity; stocks represent investments in articles with the expectation of future commercialization; need to balance inventory costs (product costs and storage costs) and expectations relative to market needs (minimization of excessive stocks or breakages);
- Existing needs: increase in service excellence levels; greater agility and precision in storage operations; improving the location of products in the warehouse; greater efficiency in the shipping process and product traceability; improvement of online channels by reducing the average time associated with the commercial cycle;
- Expected benefits: reduction of the average time to orders preparation; process simplification to goods localization; storage space optimization; permanent and real-time inventory; traceability of items from reception to the customer delivery; reduction of flight and dispatch errors; reduction of time in internal logistical flows; reduction of logistical costs; increased productivity; real-time decision-support information; adaptation to e-commerce needs; and omnichannel operations management;
- Management expectations associated with the investment: estimated earning of a predictable staff reduction of 30%; order cycle time reduction from 1h to 0.45h (25% of estimated earnings); increase of daily expeditions with estimated earnings of 25%); estimated a predictable reduction of 50% in the time associated with the reception and checking and storage of merchandise; a predictable decrease of 50% in the time related to the delivery routes; increase of about 30% in shipping speed; 30% reduction in shipping errors, 20% increase in the quantity of orders/day shipped; reduction of about 35% in consumables; earning front reduction of inventory counting 50%; and, elimination of printed orders;
- Investment: 50,000.00€ (some dimensions: software – 7,004.00€, project implementation – 6,368.00€, hardware – 5,084.50€);
- Identified costs: annual license – €3,151.80, maintenance contract/year – €2,500.00, consumables/year – €500, Wi-Fi network in the logistics center/year – 3,750.00€;
- Risks: highlighted the possible resistance to change by logistics operators; disruptive change in processes and practices; absence of appropriate training plan;
- Necessary technical characteristics: multi-warehouse; independent database (vertical solution); real-time operating system; and integration with ERP;
- Functional characteristics: picking; inventory; graphical drawing of the warehouse; management of document types; physical definition and layout logic products; traceability; customer and supplier management; order management; route management; radiofrequency terminals; operations management; and reverse logistics;
- Decision Criteria: safety; functionalities; integration with ERP; ease of use; compatibility with other technologies used; maintenance.

So, considering this first phase of the study, the study carried out allowed us to see that the proposed investment in digital transformation was viable given the assumptions considered. Also, the strategic decision-making associated with the digitalization of the warehouses was adequate. The focus group considered that the management dimensions, namely the financial nature, were important and adequate for a rigorous evaluation and a safe decision for the recommended investment.

In the first place, the focus group considered adequate the necessity of nature and amount assessment of the investment made, as well as the expected costs. Regarding these two dimensions, the nature and the amount of the investment, it was possible to determine, as can be seen in Table 1, the respective adequacy. It should be noted that the estimated values for the global investment were adequate, namely, regarding considered nature (Software and Project implementation).

Table 1. Nature and amount of investment made

Investment	Adequate	Not adequate
• Total investment – 50,000.00 €		√ (↓34%)
• Software – 7,004.00 €	√	
• Hardware – 5,084.50 €		√ **(**↑ 10%)
• Project implementation – 6,368.00 €	√	

The focus group noted, as substantial evidence, that the mention, in Table 1, of the not adequate value of total investment corresponds in fact to a positive result, insofar as the overall value of the investment made was lower than expected. However, the previous value to hardware was insufficient, with an increase of 10% approximately.

Regarding the nature and amount of the costs considered, it was possible to determine, as can be seen in Table 2, the adequacy of the elements considered, except the wi-fi network.

Table 2. Nature and amount of associated costs

Costs	Confirmed	Not confirmed
• Annual License – 3,151.80 €	√	
• Maintenance contract/year – 2,500.00 €,	√	
• Consumables/year – 500.00 €	√	
• Wi-Fi network in the Logistics Center/year – 3,750.00 €		√ (↑ 125%)

It should be noted the existence of considered deviations referring to the wi-fi network, having registered an increase of 125% in the value initially foreseen. This value resulted from an incorrect technical analysis of the technical requirements regarding the constraints of the physical architecture of the warehouse.

Regarding the second phase of the study, the assessment of management project practices developed, it was possible to confirm the adoption of all critical dimensions that must structure a project, as can be seen in Table 3.

Table 3. Critical elements associated with project management

Adoption of critical dimensions associated with project management	Yes	No
• Delimitation and management of the scope and objectives of the project	√	
• Identification of the project team and respective person in charge	√	
• Definition of a deadline for the execution of the project	√	
• Definition of a budget for the project	√	
• Development of a Work Breakdown Structure and planning of associated activities	√	
• Control of the expected results regarding the investment	√	
• Identification and management of associated risks	√	
• Confirmed the assumptions of values adopted in the feasibility analysis	√	

Regarding the third phase, change management, an attempt was made to assess whether change management was considered, whether it was developed as a sub-project within the overall project,

whether the most significant risks were identified, the probability of occurrence, and the respective impact.

In this case, it was possible to determine the development of a sub-project specifically related to the change. Regarding risks, the following were considered: resistance to change by logistics operators, disruptive change in processes and practices, and absence of an appropriate training plan. The focus group confirms the analysis of these risks, namely regarding the probability of occurrence and the respective impact.

Table 4. Risks in the digital transformation process

Risks	Organizational impacts	Financial Impacts
• Resistance to change by logistics operators has been highlighted	X	X
• Represent a disruptive change in processes and practices	√	√
• Absence of an appropriate training plan	X	X

In the analysis carried out, it was possible to verify, on the one hand, the non-occurrence of change resistance and, on the other hand, the development of an appropriate training plan to increase the professional competencies of workers. It is essential to highlight that the project of digital transformation represents a disruptive change that demands change management.

Regarding the last phase, the analysis of the global evaluation of the project was carried out, namely about the degree of fulfilment of the objectives and expected results with the respective implementation. It was possible to verify that this practice was adopted regarding the project control practice. About the objectives of the investment project, it was possible to identify that, as can be seen in Table 5, these were achieved.

Table 5. Objectives of the investment project

Needs associated with the investment	Increased	Not increased
• Levels of service excellence	√	
• Agility and precision in storage operations	√	
• Improved location of products in the warehouse	√	
• Efficient shipment process and product traceability	√	
• Support the online channel	√	
• Improvement in the average time associated with the commercial cycle	√	

Regarding the expected benefits of the investment, it appears that, globally, the identified benefits were achieved, as shown in Table 6.

Table 6. General benefits expected with the investment

Benefits expected	Achieved	Not achieved
• Reduction of the average time of preparation of orders	√	
• Simplification in the process of locating goods	√	
• Optimization of storage space	√	
• Permanent and real-time inventory	√	
• Traceability of items from reception to the end of the Sumer	√	
• Reduction of flight and dispatch errors	√	

• Reduction of time in internal logistical flows		√
• Reduction of logistical costs	√	
• Increased productivity	√	
• Real-time decision-support information	√	
• Adaptation to e-commerce needs	√	
• Omnichannel operations management		√

The only benefits that cannot be achieved with the investment were the reduction of time in internal logistical flows and the omnichannel operations management. It will be important to understand the reasons for this impossibility, insofar as it is to be expected that with the digitization and automation of warehouses, an almost automatic reduction of time in internal logistical flows will be obtained.

Regarding the specificity of management benefits, all of them were achieved, as can be seen in Table 7.

Table 7. Expectations of management benefits

Expectations of management benefits	Achieved	Not achieved
• Estimated earning of a predictable staff reduction of 30%;	√	
• OCT – Order Cycle time: reduction from 1h to 0,45h (% of estimated earnings: 25%);	√	
• Increase of daily expeditions with estimated earnings: 25%	√	
• Estimated a predictable reduction of 50% in the time associated with the reception and checking and storage of merchandise	√	
• Predictable decrease of 50% in the time related to the delivery routes	√	
• Increase of about 30% in shipping speed	√	
• 30% reduction in shipping errors, a 20% increase in the quantity of orders/day shipped	√	
• Reduction of about 35% in consumables	√	
• Earning front reduction of inventory counting 50%;	√	
• Elimination of printed orders	√	

Regarding the observation of the requirements associated with the acquired ICTs, it appears that the identified technical requirements were achieved, as shown in Table 8.

Table 8. Technical characteristics of ICT

Technical characteristics	Achieved	Not achieved
• Multi-warehouse	√	
• Independent database (vertical solution);	√	
• Real-time operating system	√	
• Integration with ERP	√	

Concerning functional requirements of the software, it was possible to verify that most of them were achieved, according to Table 9.

Table 9. Functional characteristics of the software

Functional characteristics	Achieved	Not achieved
• Picking	√	
• Inventory	√	
• Graphical drawing of the warehouse	√	
• Management of document types		√
• Physical definition and layout logic products	√	
• Traceability		
• Customer and supplier management		√
• Order management	√	
• Route management	√	
• Radiofrequency terminals	√	
• Operations management	√	
• Reverse logistics	√	

Globally, most of the functional characteristics were contemplated in the software. Only two of them need specific attention and eventual future development, namely, the management of document types and customer and supplier management.

Finally, regarding the selection and decision criteria to choose the best ICT solution, the criteria shown in Table 10 were adopted.

Table 10. Selection and decision criteria

Selection and decision criteria	Considered	Not considered
• Safety	√	
• Functionalities	√	
• Integration with ERP	√	
• Ease of use	√	
• Compatibility with other technologies used	√	
• Maintenance	√	

Conclusions

The digital transformation of companies is a reality. The pressure of technologies and, above all, the need for competitiveness in the market justify the need to digitize some organizational areas or processes to support the respective activities. The contingencies associated with the recent pandemic have increased the relationship with customers through digital channels and consequently require organizational responses to this new reality. As such, information systems also had to evolve and adapt to this new modus operandi that reflects a transition from traditional and physical channels to virtual channels.

The case studied evidence that the digital transformation cannot only correspond to the introduction of more technologies. This process must be accompanied by an economic and financial analysis and assessment and complemented with adequate change management to allow the establishment of a new

way of functioning. In a highly competitive economic context, it is important that management can determine the value generated by the investment to be able to identify the achievement of expected benefits.

The new storage automation strategy was, in this case, the trigger for the beginning of a digital transformation process. In the publishing sector, with the importance of electronic commerce channels, this has been a natural strategy for all the managers present in the focus group. Although the economic criticality of the warehousing management system, as we can see through the case analyzed, an adequate framework for the associated project ensures efficient and effective management of the expected value.

It seems to be evident that all investment projects require a viability study, and every investment project demands project management practices. It is also important to highlight that the project on digital transformation needs to change management practices' adoption to guarantee the predeterminate results. These are the major findings of this research work. It is also possible to highlight the relevance of collective results project assessment as a win-win practice between all the stakeholders that directly or indirectly participated in the project. That allowed a collective feeling of success.

In a global conclusion, as stated by Westerman (2018), it is not enough to acquire software associated with storage management to expect the automatic acquisition of competitive benefits.

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