Challenges and Opportunities: The Case for new Technologies' Implementation in Romania

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Abstract: Purpose: This article intends to identify, understand and explore the challenges and critical success factors ("CSF") arising from implementation of new technologies in Romanian companies. We conduct a cross-industry partially explanatory, partially exploratory research focusing on 3 business cases whereby innovative technologies such as automation software, industrial robots and continuous steel melting through the use of electrical cauldron have been implemented. Research Methodology/Design: We have used a case study approach. We've reviewed and mapped the existent academic literature on the subject matter, we have conducted interviews with business stakeholders, we have traced the identified challenges and CSF' and measured their occurrence in relation to the case studies. Findings: The results suggests that there are several pervasive challenges such as conflicts among the stakeholders, no management and/or employee buy-in, value misalignment and resistance to change that if appropriately mitigated can lead to successful outcomes. We've also identified a number recurring critical success factors that can ensure the effective implementation of the new technologies such as management buy in and understanding of value proposition. Research limitations/implications: The current study further extends the existing research on challenges and CSF related to the implementation of technologies from the standpoint of innovation theory. Practical Implications: The present article further expands on the exploration research performed so far on challenges and critical success factors related to the implementation of new technologies taking the scholarly research and validating the findings in the real business world. Originality/value: The current research study provides practical evidence using cross-industry occurrence-based validation testing to indicate the challenges and critical success factors related to the implementation of new technologies in Romanian companies. It adds to the exploratory research on technology transformation as it pertains to jurisdictions that, more often than not, are outside the research radar, given

Keywords: disruptive technologies, sustainable technologies, resistance to change, artificial intelligence, strategy, value chain, software development projects

1. Introduction

The implementation of new technologies brings forth change, hope for performance improvement, effort in resource deployment, need for effective project management, need for technical understanding of the technology, challenges before and after project implementation. In the current study we formulate a two folded research question across the studied cases within three industries: are there similarities among the identified challenges faced and the critical success factors that need to be accomplished irrespective of the industry where the new technology (disruptive or sustainable) is implemented?

We chose three industries that are not interrelated, and we have developed a case study approach on the companies activating in the steel, industrial robotics automation and software hyper-automation industries. The case study research regarding new technology implementation goes back a few decades (Barton and Kraus 1985). Factors Research Framework and its sister approach, Exploratory Factors Analysis, have been used many a time in identifying and reviewing critical success factors (Boison and Dzidonu 2015).

We have used an exploratory and explanatory approach because of the need to better understand the implications involved in the assimilation of the new technologies triggered by the identified challenges and CSFs. In this respect, we have conducted a series of interviews and applied industry research to understand in detail the different facets of technology implementation. We wanted to use a heterogenic approach in selecting the subject matter industries. It was critically important to choose nonrelated industries and organizational cultures at different ends of the spectre. We have delved into understanding the steel mill plant (TMK Resita) cultural frame in responding to challenges or establishing critical success factors a company with rooted traditions and highly structured hierarchy. We have reviewed the typology of organizational responses on implementation of industrial robots' technology (Staubli) and we have looked into the intricacies of managing many a stakeholders interests in large scale projects of software and hyper automation implementation (Connections).

In the case of TMK Resita, we have reviewed the post-communist evolution of the business, the drastic restructuring initiatives that took place within the still mill plant, the metamorphosis of the company, the critical moments, and the organization's reactions some of which led to delays in taking the necessary steps of implementing the technology. TMK Resita has both domestic and overseas customers and following the fall of the iron curtain had to face the danger of losing the major markets comprised of former communist jurisdictions. Now it operates with a marginal fraction of the number of people that were part of the organization as more than 92% of the employees were made redundant. The production was also significantly reduced, and margins were optimized to ensure competitiveness.

Unlike the other two cases, the implementation of continuous melting cauldron technology in TMK Resita was a critical must. It was a milestone that ensured the survival of the organization and a paramount step in solving the competitiveness issues. Big economically inefficient projects, top management indecision and lack of focus, conflicting stakeholders' interest were major obstacles in initiating the deployment process for the new technology (Ioan, Romulus Vasile, 2018).

The *second subject* matter research case in assessing challenges and CSFs was in the sphere of industrial robots' automation, in particular plastic injection production lines. Staubli is a manufacturer and seller of industrial robots. In Romania the company focuses on selling solutions for plastic injection production. Plastic injection is one of the industries where smaller production series with more deliveries and reduced stock is key to profitability.

Staubli's solution to getting these results is SMED. Part of the Lean Manufacturing method, SMED is an acronym for Single Minute Exchange of Dies. There are 4 big processes changing the mound which can be split into: unloading/loading of the mould, clamping the mould, connection of energies and parts handling and robotics. Staubli's approach is emphasizing on flexibility and modularity. Each stage ca be implemented either as part of a larger solution or as a standalone solution. Also, any solution can be implemented at OEM level or as a retrofit. Moreover, the solutions can be fully automated, manual or hybrid, depending on the customer's budget and expected ROI.

The existing plastic injection technologies pose the challenge of extensive time lag. It means loss of competitiveness due to potential lower quality products and higher lead times for the clients posing a threat to the business' turnover and profitability. The outcome from implementing the Staubli robot technology is elimination of idle time and reduction in manhandling within the manufacturing process and ultimately costs reduction

In the *third case*, we have explored a business that provides hyper-automation and software development services. We have focused on a large- scale project part of a top 10 Romanian bank's "digital" bank initiative. It involved the automation of the customer "On Board" process, the automation of the credit approval for small and medium sized enterprises, integration with other bank systems.

The Automation of On Boarding entailed among other things, video identification, identity validation, fiscal and judicial validation for companies. The digitalisation of the Credit Approval Process involves standardised products and advancing finance based on automated scoring solutions. The Connection solution integration was twofold: via API and retrieving data through newly created software robots

Our research on the three cases focused on identifying, explaining, and exploring the implications of the challenges faced and the respective CSFs associated with the implementation of technologies across three different industries and three different organizations. We have reviewed the existing literature to understand and potentially expand on the relevant theories and use of the CSF framework. We have decided to use interviews and qualitative assessment to determine similarities dissimilarities among the challenges and CSFs identified upon implementation of sustainable or disruptive technologies across the studied industries.

In the "*Theoretical Background*" section below (Section 2), we summarise the relevant literature review, highlighting the theories applicable to our cross-industry case study research. We review the Technology Acceptance Model and its implications. We were particularly focused on identifying the implemented technologies, using Christensen classification (Christensen 1997). We then turn to recognizing challenges and opportunities as they rise from the three practical studies. We discuss the main elements pertaining to these research areas.

The 3rd section of the paper, "*Methodology*", we detail the research approach using a structured model and a codified method of identifying patterns of occurrence for the discussed challenges and opportunities. Consequently, we build an occurrence matrix, and we draw our findings (Section 4 below) and issue our conclusion remarks (Section 5 below).

2. Theoretical background

Technology is a concept almost as old as mankind. It has suffered multiple transformations since the dawn of man, and it stood at the forefront of mankind's societal, economic, political, and environmental evolution. Timing, usefulness, ease of use, are but a few elements of the Technology Acceptance Model "TAM" first developed a few decades ago (Davis 1986) and later extended in TAM2 by Davis and Venkatesh (Davis and Venkatesh 2000).

While people's perception within the destination organizations plays a major role in accepting technology, the markets' response to the deployment of new technologies can also bring forth challenges and need for success factors that ensure the positive outcomes. We used the classification coined by C. Christensen in his seminal works on innovation and technologies to understand the types of technologies implemented in the three case studies. Thus, based on the market-oriented classification, we have assessed whether the technologies implemented in the researched companies were disruptive or sustainable (Christensen 1997).

During our literature review we analysed relevant research papers on critical success factors regarding technology implementation such as for example ERP implementation CSFs as exemplified in the Venugopal, Suryaprakasa (2011) in their research using a case study approach to identify outcomes from implementation of ERP systems in India. They conclude that is the way the success factors are intertwined among themselves that lead to successful outcomes and full ERP integration. We looked at the decisions making process effect on technology implementation from a strategic management, operational and total quality management perspective (Friday-Stroud, Shawnta S., Sutterfield, J. Scott 2007) and reviewed the unified framework proposed by the authors to understand the ingredients of a speedy decision-making context. Other factors such as management acceptance in restructuring cases (Flemming 2017) were also identified. Value chain analysis in the academic literature was also part of our literature review. We reviewed the causality relationship between an organization's value proposition and the motivation of front lines employees (Liewendahl, Heinonen, 2020). Authors, conclude that having relevant employees understand the organization's value proposition is key to ensuring strategic success. Organizational culture and organization's constituents play a majore present a challenge for implementation of technologies (Roblek, et al 2021). We turned our focus towards the challenge of stakeholders' conflicts as an academic research subject matter. Subjective reasoning, scarcity of sound judgement, personality misalignments are relevant factors that constitute a challenge when it comes to crisis situations (Mysore et al. 2019).

In his pioneering book, The Innovator's Dillema (1997) Christinsen coins the term distruptive technology *and defines it as "a technology that either captures low level market customers over satisfied with the existent products or services (low level disruptive technology) or targets non consumers through its novel characteristics (new market disruptive technology)"*

On the other hand, a sustainable technology is a technology that improves the capabilities, features of products and markets of the said products/services at higher prices producing higher margins to customers that are willing to pay higher stakes for the given products/services (Christenses 1997, Cristensen and Raynor, 2003).

Based on the said definitions, we have proceeded to assess whether in the 3 case studies, technologies were either disruptive or sustainable, or had other characteristics. The below table shows the evolution of the electrical cauldron technology.

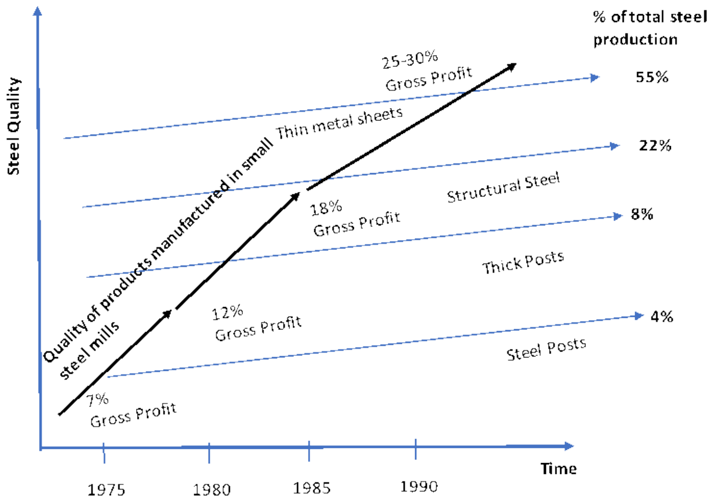
Table 1: Classification of Implemented Technologies based on Christensen definition - 3 case studies

Case No	Company	Implemented Technology (Christensen's Defition- 1997)
1	TMK	Established Technology (former "low-level" disruptive technology)
2	Staubli	"New Market" Disruptive Technology (geographical new development)
3	Connections	"New Market" Disruptive Technology (industry specific new development)

In Case 1- TMK Resita we found that the technology already had a world-wide geographical spread within the steel industry a couple of decades before it was implemented within the company. Initially, the continuous melting using the electrical cauldron technology was a "low-end" disruptive technology (Christensen and Raynor 2003) but by the time it was implemented in the Romanian company it was already an established practice in the industry.

Melting of scrap iron and steel using the electrical cauldrons under the continuous melting process ("EC") is a technology that was marketed in the early 1970s. The first comers were small steel mills that entered into the low margin steel posts and armature which was initially a lower quality product. As large integrated steel mills did not consider this new technology to be a threat, they focused on producing steel products that provided higher profit margins (Christensen and Raynor 2003).

As time went by the electrical cauldron technology was used in manufacturing higher classes of steel products and by 1990s, 55% of the total steel production was performed using the electrical (arch) cauldron.



Source: Clayton M. Christensen, Michael E Raynor-*"The Innovator's Solution: Creating and sustaining Succesful Growth"*

Figure 1: The Evolution of the CM disruptive technology in the steel industry

This penetration of continuous melting technology using electrical cauldron is an example of a *low-end* type of disruptive strategy.

In the case of TMK Resita, however the switch to the "arch" type cauldron came as an imperative to sustaining the business. The manufacturing facility was reconfigured, and the organization was restructured to be able to apply the new technology in an efficient and effective manner.

By the time TMK Resita turned on the electrical cauldrons, the technology was present in its market for more than a couple of decades. However, it is important to pinpoint the fact that implementing EC at TMK Resita was an extensive process that trailed for a long period of time, primarily due to factors independent of the technical aspects related to the installation of the equipment and the related infrastructure.

In the case of Staubli, on the other hand, we are looking at a technology that is under continuous development which for the Romanian market has a disruptive effect. Robotics and industrial automation is a dynamic technological concept that is shaping efficiency and effectiveness throughout a plethora of manufacturing processes. Industrial Robots and Robot Structures comprise different configurations (Wilson 2015): Articulated, Scara, Cartesian, Parallel (or Delta), Cylindrical. The most common structure is the articulated arm industrial robot. Industrial robots have two common ways of operating: teach mode and automatic mode. The main feature of the teach mode is that control is held by the operator (it is an editing mode). The second feature is the automatic mode whereby the real-time capability is eliminated (Wilson 2015). Staubli markets both articulated six axis as well as scara (4 axes) robots. The main target market in Romania is plastic manufacturing and in particular the injection and moulding processes which can be fully automated.

Nevertheless, while the analysis of the dynamics of this technology is a rich and provoking subject matter, we chose to turn our research focus on studying the impact of the industrial robots' technology on the Romanian organization in the plastic manufacturing industry.

Case 3, on the other hand, involved the enactment of a disruptive automation technology for a large Romanian bank (ranked among the top 10 banks in the country). This complex implementation entailed the joined effort of a consortium of solution providers ranging from business process analysis consultants to low code it solution providers. The first area tackled by Connections was the digitalization of the customer "on boarding" process. This project phase, involved among other, video identification of the customer, identity validation, fiscal and judicial validation. Another project phase focused on the digitalization of the Credit Approval Process handling standardized products and advancing finance based on automated scoring solutions. The Connection solution integration was twofold: via API and also retrieving data through newly created software robots.

While identifying the characteristics and assessing the types of technologies being implemented in the three companies is a intriguing and noteworthy research initiative, as mentioned in the above paragraphs, we chose to focus our research on the conceptual basis of the technology impact on the 3 organizations and the responses from within these environments rather than looking at the industry level and assessing the degree of disruption or sustainability of these technologies for that matter.

Therefore, during our research, we were concerned with assessing the challenges and critical success factors present in these cases and with finding similarities if any across the industries. Our findings are documented in a dedicated section of this article in the below paragraphs.

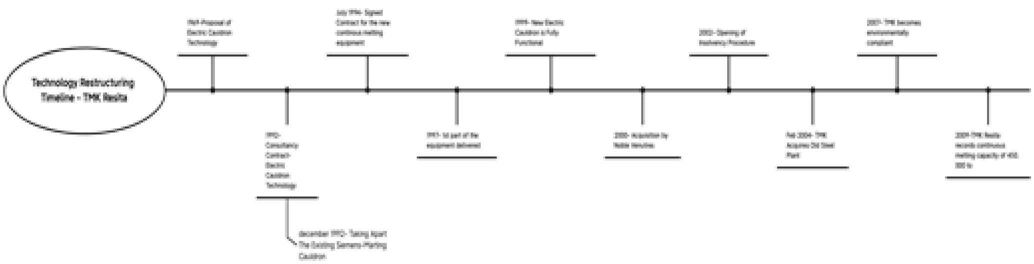
There were several challenges posit by EC implementation.

TMK CHALLENGES:

- *The extensive time lag* starting with the initial identification of the need to implement the new technology and the time it was implemented.

Time is paramount in the implementation of new technologies being ERP software or hyper-automation or continuous melting cauldron. Effective time management is critical in achieving the desired otucomes (Venugopal and Rao 2011).

In 1969 engineers Ioan Prisecaru and Prof Nicolae Murgulet proposed in their study "The perspective development of the steel manufacturing process" (Vasile Romulus Ioan, 2008) " the relocation of the infrastructure and the transformation of the steel manufacturing process through the introduction of the electric cauldron technology. Author Vasile Romulus Ion in his book, "Istoria Fierului: Banatul Montan", maintains that the lack of success about the implementation of the EC technology is due to the unwillingness of the executive management to get outside of the comfort zone (Vasile Romulus Ioan, 2018, p486). Consequently, Resita begins using the electrical cauldron on 22nd of December 1999 and starts the continuous melting process for the first time in 2007 under a "forced-process" implementation. Below we evidence the timeline regarding implementation of the new technology in TMK Resita



Source: Ioan Romulus Vasile, Istoria Fierului, Banatul Montan, 2018)

Figure 2: Timeline of new technology implementation in TMK resita

- *The second challenge, Conflict of Interest* is quite often present in the academic literature when it comes to implementation of technologies or initiation of transformational projects. Mysore, Kirytopoulos, Ahn and Ma (2019) point out that based on their RII measurements, governance glitches and dysfunctional conflicts, clash of personalities are among the top factors causing adverse situations in project implementation. The resolution of the conflicting interests becomes critical in ensuring the success for the implementation of new technology. Only by reconciling the needs of all stakeholders involved can implementation become effective (R Larson 2020).

In the case of EC technology implementation, stakeholders' conflict of interest plaid a major role in stalling the new set up.

Following the 1989 revolution, the manufacturing plant in Resita is placed under the "State supervision regime according to government ordinance nr 301/1993" and tensions are building up among employees. State authorities are slow in taking initiative over what strategies should be set in place to restructure the company. Mass protests and conflicting governmental agency phenomena, amplify the negative economic spiral of the company and financial support becomes harder to contract.

Eventually, restructuring the TMK organization and brining in a turnaround team lead to conflict resolution and the possibility of moving on with the new technology implementation

- *High Management Turn Over* lead to delays in the decision-making process with significant effects over the course of the business. Partly due to lack of understanding, partly due to being complacent with current organizational status quo, management took little initiative in implementing what was needed in terms of technological change.
- *Big Legacy Projects* have become major consumers of resources and kept eating out time and money from other important activities such as the implementation of the EC Technology.

Connections Challenges

In the Connections case, the bank automation project conflict of interest among the stakeholders was also a significant challenge. While the Beneficiary's executives were prone to undertake the automation of customer on boarding, credit approval for SMEs and integration with other bank systems, middle management was more inclined to slow down the pace of the project. Partly due to misunderstanding of project objectives, partly due to overwhelmed human capital and fear of change, middle management was reticent in moving on with the implementation of the project. It took significant effort from the Beneficiary's top leadership to mobilize the project team.

3. Methodology

Approach

We have used a grounded theory approach. During our explanatory and exploratory research, we have built a structured process comprising several stages:

Stage *1*. We've conducted literature review, interviews, existing reports whereby we've determined the relevant theories, and understood the individual context of the three cases ;

Stage 2. Based on the literature review, we've identified the prevalent challenges and critical success factors ("CSFs");
Stage 3. Subsequently we, classified and codified the challenges and CSF's;
Stage 4. We've, codified the recurring challenges and CSF's;
Stage 5. We've tested the occurrence of the identified elements;
Stage 6. We've built a matrix matching the found relevant elements.

We have probed for similarity in challenges and CSF's resulting from our literature review to those identified during the case study research. Furthermore, we've verified whether certain models such as the Total Acceptance Model (TAM) could be relevant and applicable to the three case studies. We have further explored via the feedback received from the conducted interviews whether there are case specific elements that can add to the existing literature research. Consequently, findings and conclusions were drawn.

Data

The type of data that we used was qualitative in nature. Data was collected via interviews and company reports and classified according to the afore described method. For the frequency of occurrence, we have used logical tests and compiled the data accordingly. We reviewed the frequency tables to test for high and low frequencies. We've confirmed the classification and occurrence with the relevant stakeholders.

Below we discuss and evidence in a diagrammatic and numerical, the structure of the approach process and the data outlined. The below diagram shows the approach that we used to conduct our research. It describes the entire process undertaken during our exploratory research. The first step was to conduct an extensive literature review on challenges and critical success factors encountered upon implementation of new and disruptive technologies.

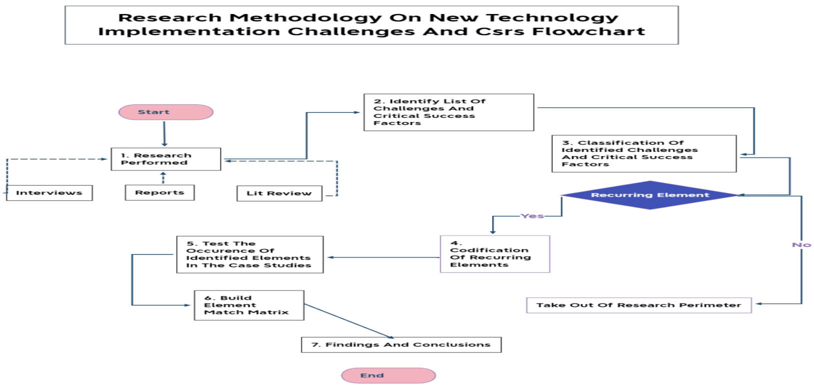


Figure 3: Diagram of the research process - Source: Research team model

We then identified the pervasive challenges and coded the recurring ones as shown in the **Table 2** below

Table 2: Cartography of identified challenges – 3 case studies

SN	Challenge Description	Literature Reference	Code
1	Significant Lead Time/	C.Venugopal and K. Suryaprakasa Rao	C1
2	Missalignment with technology implementation within the organization	J.Cc Rodrigues, A.C: Barros, Joao Claro (2013)	C2
3	Conflicting stakeholders' interest (no buy in)	K. Mysore, K Kirytopoulos, S Ahn T Ma (2019)	C3
4	Resitance to change	Vasja Roblek, Maja Meško, Franci Pušavec and Borut Likar 2021	C4
5	No value chain analysis performed by management	M Delera, C.Pietrobelli, E Calza, A Lavopa (2020)	C5
6	Harmonising internal processes and legal framework	Georgios I Zekos	C6
7	Stakeholders Buy In	K. Mysore, K Kirytopoulos, S Ahn T Ma (2019)	C7
8	Non Dedicated Resources	K Momeni, M Maarit Martinsuo	C8

At the 3rd stage of the research process, we have inventoried the Critical Success Factors ("CSFs") rising from our systematic literature review. We are highlighting the identified CSFs in the below Table 3.

Table 3: Cartography of the critical success factors – 3 case studies

SN	CRS Description	Literature Reference	Code
1	Experience Field Team	Corporate Finance	FT1
2	Financial Restructuring of Debt	S Slatter & D Lovett (1999)	FT2
3	Quick Decision Making Process by management	S.S Friday-Stroud, J S Sutterfield 2007	FT3
4	Executive Management Buy In	RB Larson 2020	FT4
5	Undderstanding of Value Proposition	H Elisabeth Liewendhal, K Heinnonn	FT5
6	Ability to obtain management buy in	E.M Fleming 2017	FT6
7	Effective Project Management	O.M. Kharbanda, Ernest A. Stallworthy (1992)	FT7

We have tested the occurrence of the identified challenges and critical success factors while conducting the case studies. We have traced the occurrence of pervasive challenges and CSR to the analysed case studies.

After each conducted interview, we have obtained identification of the challenges and performed codification of the respective CSRs as shown in the below table

Table 4: Case study codification- interviewee table

EXPERT	INDUSTRY	TITLE	COMPANY	CASE STUDY ID
CONFIDENTIAL	STEEL	CEO	TMK Resita	CAS1
CONFIDENTIAL	INDUSTRIAL ROBOTICS	SALES MANAGER	STAUBLI ROMANIA	CAS2
CONFIDENTIAL	HIGH TECH	CEO	CONNECTIONS CONSULT	CAS3
CONFIDENTIAL	HIGH TECH	Project Manager	CONNECTIONS CONSULT	CAS3

Prioritization was established in order of the element's significant to determine a hierarchy of impact.

We have built a direct match matrix to highlight the occurrence of the identified elements to their occurrence in the studied cases as depicted in the below **tables 5 and 6.** The match within the shown matrix tests the validity of the research question. **Table 5** below shows the occurrence matrix of challenges in the respective case studies. **Table 6** below shows the occurrence of CSF in their respective case studies.

Table 5: Challenges occurrence matrix

Case Study ID	Challenge Code	Occurence
CAS1	C1	1
CAS1	C2	1
CAS1	C3	1
CAS1	C4	0
CAS1	C5	0
CAS1	C6	0
CAS1	C7	0
CAS1	C8	0
CAS2	C1	0
CAS2	C2	0
CAS2	C3	0
CAS2	C4	1
CAS2	C5	1
CAS2	C6	0
CAS2	C7	0
CAS2	C8	0
CAS3	C1	0
CAS3	C2	0
CAS3	C3	0
CAS3	C4	0
CAS3	C5	0
CAS3	C6	1
CAS3	C7	1
CAS3	C8	1

Table 6: CSFs occurrence matrix

Case Study ID	CRS Code	Occurence
CAS 1	FT1	1
CAS 1	FT2	1
CAS 1	FT3	1
CAS 1	FT4	0
CAS 1	FT5	0
CAS 1	FT6	0
CAS 1	FT7	0
CAS 2	FT1	0
CAS 2	FT2	0
CAS 2	FT3	0
CAS 2	FT4	1
CAS 2	FT5	1
CAS 2	FT6	0
CAS 2	FT7	0
CAS3	FT1	0
CAS3	FT2	0
CAS3	FT3	0
CAS3	FT4	0
CAS3	FT5	0
CAS3	FT6	1
CAS3	FT7	1

Based on the result, we have issued our findings and conclusions.

4. Findings

Given the applied methodology and the objectives of our research, we have found that a few challenges and critical success factors were dominant in the analyzed case studies.

Among the challenges that we have pinpointed as recurrent were conflicts among the stakeholders, no management and/or employee buy-in, value misalignment and resistance to change.

In our exploration to further understand whether attitudes and perception of people within the organizations were adding weight over the resulting challenges we found that in the case of Staubli for example, the misunderstanding of the thermal plastic molding technology by the acquisition department or the misalignment of stakeholders did not ensure a successful implementation of the solution in many of the targeted companies. In companies were the operational/technical managers were the decision makers, in other words had a good understanding of the technology and its implications. Where the decision process involved sign off from many stakeholders often with different views on the matter, the percentage of technology implementation was marginal.

Middle to lower-level manager's attitude was in general reticent and distrustful towards the newly presented technology. In the Connections case, we found that certain middle level managers assigned were not fully aware of the details of the project deployment.

In Case 2, there were instances automation robots left for testing purposes by the supplier were kept even more than 1 year on factory premises without being tested.

In terms of repetitive critical success factors, we have found that management buy in and understanding of value proposition were the repetitive factors in ensuring effective outcomes for the researched case studies.

With the partical exception of *Case 3*, value chain analysis was seldom performed in full prior to the decision of implementing the new technology. With the partial exception of Case 1, the management value determinatio was performed by the supplier of the solution.

5. Conclusions

We conclude that there are similarities among the challenges identified through our research across the subject industries such as decision misalignment or resistance to change. However, there are also several dissimilarities that vary because of the economic and decisional context as well as because of the technology applied. In *Case 1*, for example, TMK Resita, the largest hurdle was handling overstaffing, ineffectively economic on-going processes and stakeholders' conflicts that lead to material delays in technology activation. In *Case 2,* missing value chain analysis and attitude were also obstacles in activating technology deployment. *Case 3* on the other hand we found there are few to no dedicated resources while harmonizing internal processes with external standard regulatory prerequisites.

6. Practical implications

Our study extends on the case study research, and it is focused on companies activating in Romania. It performs a cross industry part exploratory, part explanatory research on challenges and CSFs faced by domestic companies. In this respect validates the hypothesis that there is a common ground for challenges and CSFs encountered upon new technology implementation be it sustainable or disruptive. The study can be used as a starting platform for further exploring a mapping the factors and challenges at the macro-economic level in Romania that led to overall technological successful deployment

7. Limitations

In terms of limitations, given that this is a part explanatory, part exploratory research study, there is no econometric, correlative analysis on the challenges and the respective and further analysis should be undertaken to understand the causality relationships between the challenges and the critifical success factors identified.

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