A QCA Crisp Set Study in Matching Cross-Managerial Alignment With ERP Implementation Outcomes: Leading or Misleading Subsidiary Innovations

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ABSTRACT

Qualitative comparative analysis (QCA) is the most important methodological innovation in management and social science in the last two decades. This paper attempts to use this innovative research method to study innovation in a Parent-Subsidiary ERP implementation project. A Crisp set QCA study is used to study 18 company-wide system projects in subsidiaries of a multinational enterprise (MNE). The generic applications of the innovation projects enabled the study to have a common denominator to gauge the innovation resulting in a variance of planned and actual completion dates. Although the data collected was from a completed projects log, the study took a subsidiary-innovation approach to measure the managerial alignments and the possible application of agency theory.

KEYWORDS

Agency Theory, Parent-Subsidiary Relations, Subsidiary Innovation

INTRODUCTION

Parr et al. (1999) explain ERP as a twofold cost center, including the cost of the product (Package) and the implementation cost and how missing deadlines can result in hefty losses. The study from 1999 is vital. Companies were transitioning to ERP as a new system; later studies mainly concerned upgrading, switching ERP vendors, or tech augmentation of the existing system. An interesting observation in most ERP-related publications is that researchers always mention the fear and risk of missing deadlines but seldom add project overruns into the predictor variables to assess the success or failure of ERP. Managerial aspects and balance of business & tech knowledge possessed by the business analyst and consultant has been at the forefront of previous literature. ERP can be defined as a large system divided into smaller systems that depend on the successful completion of one another and may also have intricate interdependencies. With estimated cost based upon the mutually agreed projections approved and sanctioned by the management, the variance in smaller systems’ successful implementation might fall in the tolerance threshold but is a precursor to the worry of affection exponentially to the total project success due to the dependencies. Focusing too much on a successful start by management can mismatch the resource allocation leading to bottlenecks and missing deadlines. This study pertains to 18 projects in an MNE, which makes the parent company, foreign subsidiary, business analyst, and consultants the stakeholders. Parent-subsidiary relation is
an aspect that previous literature has generalized; this study aims to dissect the alignment of parent-subsidiary relation in ERP outcomes.

Fear of Failure?

Ouslis et al. (2020) put out a head-turner by introducing success by rewarding failure. The fear of failure in this study can be theorized as a catalyst for misappropriating and proportioning the resources. Fear of failure can arise from the smallest of deadlines missing as one successful module results in the start of the other; a slight delay can result in a collective fear of having a snowball effect on the modules that await successful completion of the delayed module.

Nguyen & Saetre (2017) elaborated on failure-innovation and learning leading to the right mix to transform into success. The failure in innovation presents a lot of learning for organizations that most organizations are not good at learning. This paper dissects the variance of ERP outcomes in foreign subsidiaries to achieve innovation and generalization of the system.

A Successful Project, a Relative Or Absolute Term?

We have a few definitions for a successful project. A project running over-budgeted cost or time is deemed to be an unsuccessful project. In most of the literature on project management, a certain projection of success is expected from a project, meaning the work in progress should show the promise of the project’s end goal. A large company-wide project has an SDLC (software development life cycle) to follow, but at the same time, certain managerial, political, and a constant “sell the progress” or “sell the stalemate” to the stakeholders takes place behind the scene. In the case of MNE’s foreign subsidiaries and parent organizations, getting the system done by consultants winds up intricately. The project becomes burdensome and even results in increasing costs of management.

Innovation; A Key To Survival

Innovation has been considered a key phenomenon for the survival of a firm irrespective of industry. Successful innovation projects add competitive advantage the same way failed innovation projects present a company with key areas of improvement (Eveleens, Chris. 2010). This study of innovation failed, and successful projects within the same MNE presented us with asymmetric behavior and approaches of the foreign subsidiary when measured against the expected innovation of the parent organization. The visible faultlines and misalignment when expected innovation is measured from parent and subsidiary perspectives calls for further research.

Parent-Subsidiary Relations

Parent-subsidiary relations have become especially important in the context of global enterprises which are under immense pressure to digitize. Various communication barriers impact parent-subsidiary relations, which are exacerbated in the context of cross-cultural communication (Harzing & Feely, 2008). Cultural problems are among other issues, such as different prioritization of innovation and attitudes toward budgetary constraints among parent and subsidiary companies. One such area where the problems related to communication and differential prioritization of innovation and distribution are acutely felt is the subsidiary company’s ERP implementation domain. The technological gap between the parent and its foreign subsidiaries prevents them from appropriately addressing critical situations (Barlett et al., 1986).

HISTORY OF SYSTEM DRIVEN INNOVATION

At its inception, Enterprise resource planning (ERP) was nothing short of a prop that showcased a company’s willingness to invest in advanced I.T. infrastructure. In the 1960s, ERP successfully handled inventory and quality control parts of manufacturing concerns and presenting ERP as a complete
system-wide solution was a myth. Various ERP consultants attempted to create an organization-wide system; results were predominantly not favorable. Interestingly, the projects ended or were abandoned, or consultants needed “more time” and exceeded the budget, resulting in the parent company losing interest. ERP systems handled the inventory and quality controls of manufacturing concerns. Still, most of the installations (aimed at creating a company-wide system as a whole) increased the manual workload rather than achieving automation. Most companies continued dependence on the manual legacy systems along with ERPs in place.

Globalization Raised Interest In Parent-Subsidiary Research

Companies are under immense pressure to operate on a global scale (Gupta, Govindarajan, and Wang 2008, 28). Often, the parent company is responsible for managing the operations of foreign subsidiaries (Farah et al., 2016). In the 1960s, the competitive thrust was cost, which resulted in product-focused strategies (Ghemawat, 2002) based on high volume production cost minimization, leading to the development of computerized reorder point (ROP) systems. This initially satisfied the manufacturing planning and control needs. Initial MRP solutions were big, clumsy, and expensive (Robert Jacobs & ‘Ted’ Weston, 2007). By this time, there was no such thing as a database in the technical vocabulary of implementation. In the late 1970s, a thrust toward marketing resulted in target market strategies. There was a need to integrate various functional silos, which was fulfilled by ERP software (Jacobs & Weston 2007). Enterprise resource planning (ERP) refers to software organizations use to manage day-to-day activities such as accounting, procurement, project management, risk management, and supply chain operations. ERP implementation offers novel challenges in today’s global world as supply chains transcend the boundaries of a country, and important management decisions need to take place after consultation with stakeholders located in different parts of the world from the parent company and foreign subsidiary. While the ERP system has reached a level of maturity where software vendors and users understand the technical, human resource, and financial resources required for implementation, ERP software has yet to enter an era of relatively “ease configuration” (ibid) with implementation taking over 2-3 months. As new platforms emerge, companies often race to have generic ERP software tailored to specific market segments.

State of Innovation as a Result Of Misaligned Stakeholders’ Incentives

Individuals in the parent company are increasingly also its shareholders. According to Xu and colleagues (2019), “The results show that the parent company shareholding has a negative impact on the subsidiary responsive innovation, while companies whose managers hold more shares select the relatively positive strategy responsive innovation. Moreover, the degree of separation between ownership and control rights and the external institutional environment can moderate the above relationship.” Under the concept of limited liability, it is possible for employees in the parent company also to be shareholders, which results in the risks being spread among shareholders, which makes the members specifically invested in profitability. Scholars have used the agency theory to consider instances when the interests of the owners and managers depart (Nyberg et al., 2010). There are instances when the agent’s economic reward covary with those of the owners and other instances when the owner’s preferences dictate the agent’s actions. Agency theory suggests that there is potential for “managerial mischief” (Dalton, Hitt, Certo, & Dalton, 2007) when the interests of firms’ owners and managers (agents) diverge. One posited solution to this “agency problem” is that firms align owner and agent interests through agents’ equity ownership and their compensation structure (Fama & Jensen, 1983b; Jensen & Meckling, 1976). According to Roberts and colleagues (1998), information dissemination is key to managing a global workforce. Considering Xu and colleagues (2019) findings, this paper considers the relations between a parent company and foreign subsidiaries and their impacts on the cost variation and the total time incurred by implementing the ERP.
Research Design of the Study

The paper asks explicitly how the success or ease of ERP implementation and customization is a product of parent-subsidiary relations, specifically their differential prioritization of innovation. The paper also considers the usefulness of subsidiary-based innovation and its potential to generate corporate innovation. The extent to which innovation is possibly compromised in the quest for standardization by the parent company. The paper will consider the factors that enable or deter the transformation of systems through the customization of ERPs. The paper considers the quality of parent-subsidiary relations & the propensity of the parent-subsidiary to compete over the need for innovation. When the ERP innovation is successful, it is likely to impact the integration of multiple departments, as they are likely to experience a greater degree of synchronization. In contrast, if the ERP implementation is poor and incomplete, it only exacerbates tensions, resulting in poor inter-departmental relations. The paper will use four conditions to measure the quality of parent-subsidiary relations (IV) and understand its impacts on ERP innovation (DV).

The study will use ERP completed projects selected in 18 countries to consider how parent-subsidiary relations impact ERP innovation in the subsidiary companies. The outcome variable is the variance recorded between the estimated duration of the project and its actual completion. The study will use the number of months over the anticipated time for completion as the outcome, which will be analyzed through the conditions shown below. The number of months has been chosen as it can also give an idea about the extra cost of (Labor, equipment) or billable hours incurred throughout the project. At the same time, the estimated period was estimated through the anticipated duration of the project after the signing off at the signing of the Memorandum of understanding (primarily professional accountancy firms).

As shown in Table 1 above, successful projects were those in which the variance, that is, the difference between anticipated time (13 months) and the actual time, was less than 35%.

The Rationale Of Variance Being The Outcome Variable

ERP Innovation is explained by the variance of the estimated vs. actual completion of the project. It would not be incorrect to mention this aspect of the study being the core underlying addition to the existing literature. Why is meeting a deadline so crucial that it can singularly measure the innovation accomplished? Earlier the MOU was mentioned, which explains the budget sanctioned for the proposed ERP; this budget is based upon the duration of the time. Since most of the resources employed cost over time, they are engaged (billable hours). The proposed deadlines already have accounted for or provisioned for the expected overruns using the industrial averages of ERPs. Deadlines that already have provisioned for unexpected latency in the project completion receive a further 35% tolerance threshold. The extra threshold is provided as certain changes, or reconfigurations are expected in case of regulatory, reporting, or unforeseen roadblocks. Going above 35% variance is a line that determines ERP innovation being successful or unsuccessful.

THEORETICAL FRAMEWORK

Innovation has been a well-researched empirically & non empirically tested phenomenon, which various models and life cycle methodologies have explained. ERP has been studied widely to analyze innovation (Ram, Jiwat & Swatman, Paula 2008). With high failure rates of ERP projects and overwhelming predictor variables identified in the literature, this study takes a position to untie the phenomenon of achieving innovation from a predetermined innovation process by introducing managerial alignments as core required conditions for innovation project success.
Revisiting the Agency Theory

Traditionally scholars have considered how agency theory implies the presence of self-interest in rational individuals (Payne & Petrenko, 2019). The study will mainly be relying on the agency theory but beyond simplistic principal-actor relations, which has been the focus of existing research, by considering how a complex web of relations exists between managers and consultants.

Organizational/ Managerial Layers

Von Zedtwitz, 2003 produced the four layers to onion out the organizational structure using legal, hierarchical, process, informal link, and network layers. In a similar fashion, managerial layers are what the project faces; moving up the layers, more red tapes are encountered, and going down the layer, the need for approval from the “up layer” creates bottles necks.

Managerial Layers Preventing Innovation

This study specifically focuses on how the demands of the parent and subsidiary company on the consultants can lay roadblocks for innovation. Scholars have thrown light on the relationship between agency and human resource theory (Spender, 2011), which is specifically useful to consider the role of consultants in the context of ERP implementation, especially as they occupy marginal roles with the subsidiary and are expected to report to the parent companies. While traditionally, the agency theory was considered from the vantage point of the self-interested leader, recent theorization has shown that self-interest is bounded by norms of reciprocity and fairness (Boose & Phillips, 2014). Some scholars have altogether dropped the agency theory in considering the ethicality of corporate governance decisions in contexts where traditional and market-oriented values, as in many of the developing countries, conflict (Mccarthy & Puffer, 2008).

Table 1. Projects

| Projects | Overtime (Over 13 months) | Completion | Module Re-adjusted | Two modules at a time | Percentage variance (under 35 % tolerated) | Crips value |
|----------|---------------------------|------------|--------------------|----------------------|------------------------------------------|-------------|
| 1        | 5 months                  | no         | yes                | no                   | 38%                                     | 1           |
| 2        | 2 months                  | yes        | no                 | yes                  | 15%                                     | 1           |
| 3        | 0 months                  | yes        | no                 | yes                  | 0%                                      | 1           |
| 4        | 5 months                  | no         | yes                | no                   | 38%                                     | 1           |
| 5        | 0 months                  | yes        | no                 | yes                  | 0%                                      | 1           |
| 6        | 3 months                  | yes        | yes                | no                   | 23%                                     | 1           |
| 7        | 2 months                  | yes        | yes                | no                   | 15%                                     | 1           |
| 8        | 0 months                  | yes        | no                 | yes                  | 0%                                      | 1           |
| 9        | 6 months                  | no         | no                 | no                   | 46%                                     | 0           |
| 10       | 2 months                  | yes        | yes                | no                   | 15%                                     | 1           |
| 11       | 3 months                  | yes        | yes                | no                   | 23%                                     | 1           |
| 12       | 3 months                  | yes        | yes                | yes                  | 23%                                     | 1           |
| 13       | 4 months                  | yes        | yes                | no                   | 31%                                     | 1           |
| 14       | 7 months                  | no         | no                 | no                   | 54%                                     | 0           |
| 15       | 7 months                  | no         | no                 | no                   | 54%                                     | 0           |
| 16       | 7 months                  | no         | yes                | yes                  | 54%                                     | 0           |
| 17       | 7 months                  | no         | yes                | yes                  | 54%                                     | 0           |
| 18       | 0 months                  | yes        | no                 | yes                  | 0%                                      | 1           |
The study contends that such contestations can be studied while remaining within the agency theory to consider both compromise and contestation between managers in the parent and subsidiary companies.

**Trust & Agency Problems**

Scholars have shown how trust and agency problems are interrelated in that as trust decreases, the agency problem becomes more prominent (Bhati, 2015). Often, the agency problem arises when corporations find new markets and exhibit opportunistic behaviors. There is a lot of scope for cooperation between competitors (Delbufo, 2018). Yet, information asymmetry remains an important source of the agency problem, as the parent company and subsidiaries vie for greater control over information at the cost of the other, even when the flow of information can yield opportunities for innovation and productivity for both the parent company and the subsidiary (Eisenhardt, 1989; Doherty & Quinn, 1999). There is evidence that parent companies spend much higher on external audits than internal audits (Mustapha, 2014).

**Subsidiary-Innovation as a Yardstick**

This paranoia can impact subsidiary innovation. As the study will show, the ERP innovation was minimal where the company had stringent policies about reporting on performance from consultants in subsidiaries. Fundamentally then the study relies on newer perspectives which consider “different levels of agency problems associated with varying roles of foreign subsidiaries (Kim et al., 2005)” instead of simply discrediting the agency theory in the understanding of global businesses and innovation (Bendickson et al. 2016). Thus, instead of simply viewing agency theory as occurring among narcissistic leaders, the study considers agency problem as a “balancing act,” between demands of universalization and differentiation in parent and subsidiaries and as occurring in webs of lateral and vertical relations, with actors situated in both the parent and the subsidiaries, instead of assuming a singular relationship between agent and principal. At the same time, the study does not use agency
problems as necessarily involving the self-interested leadership but also employs stewardship where leaders use their superior knowledge for the firm’s benefit (Miller & Sardais, 2017).

LITERATURE REVIEW

Leadership & ERP Innovation

Madanhire and colleagues (2016) have considered how the ERP framework was designed to reduce work in progress on the shop floor and inventory of South African Company. In another study, Memuri and colleagues (2006) investigated the impact of ERP systems implementation on the operational efficiency of medium-sized firms in the pharmaceutical and chemicals industry. Studies considering the impact of digitization on ERP customization and implementation are still scant, except for a few notable ones like Deshpande’s (2019) study on the impact of digitization on ERP customization on the engineer’s overall efficiency. In his research, Stanley (2020) showed that once firms established product-market fit, innovation became incremental, focused on features, functions, and processes in small and medium-sized software enterprises. Leaders were transactional (Bass 1985) and instrumental (Antonakis and House 2014) in their interaction with engineers and did not try to influence creative climate (Amabile 1996; Ekvall 1996), pursuing exploitative incremental innovation and rarely considering exploratory innovation (Tushman and O’Reilly 1996). This study asks the ramifications of the global networks, including relations between parent and subsidiary companies on innovation and its impacts on ERP modification to streamline processes. Miao and colleagues (2011) showed that subsidiary-to-parent knowledge flow is facilitated by establishing efficient formal mechanisms such as an expatriation policy, a subsidiary performance evaluation system, etc.

In contrast, knowledge transfer to peer subsidiaries is enhanced by the length of a subsidiary’s operation period and the frequency of its managers’ communications with other managers in peer subsidiaries. This study asks how parent-subsidiary relations in the age of digitization impact ERP up-gradation, customization, and implementation? More generally, it asks determinants of innovation in the globalized management of companies, in which ERP implementation is one example.

Socio-Economic Contexts

Getachew and Beamish (2021) have shown that the adverse effects of weak contracting institutions, which measure how well courts allow private parties to contract with each other, are stronger on market-seeking subsidiaries. Thus the emphasis has been on how conducive the local government is to the functioning of subsidiaries. The functioning of the subsidiary is also shaped by inter-state relations, which shows that the parent-subsidiary relation is impacted by inter-state relationality (Han et al., 2018). In addition to inter-state relations, another factor that explicitly impacts foreign subsidiary relations is the belonging of the executives in the parent company (Bebenroth & Froese 2020). Where expatriates are removed from working in the top leadership in the parent company, there is also a decline in the productivity of the subsidiary. One study conducted to understand HRM integration between the parent and subsidiary showed three main areas of contention between the parent company and the subsidiary: the standardized use of English, system design, and grey areas of H.R. policy (Simale, 2009). Other work has shown that expatriates even play the role of knowledge brokers in the context of MNCs (Ahrens et al. 2018). Implementing uniform H.R. processes is a particularly difficult process, which has been studied in the case of IT-based integration of HRM. Others have considered foreign subsidiary relations as specifically managerial tensions, including discursive struggles over power relations using control and autonomy discourses (Koveshnikov et al., 2017). Lee and colleagues (2019) argue that having a mandate portfolio with greater scope in relation to same-parent subsidiaries enhances the survivability of foreign subsidiaries; the effect is weakened when the portfolio has a higher degree of overlap with those of other same-parent subsidiaries.
Expectations from the H.Q.: Universalization vs. Differentiation

An important determinant of subsidiary performance has been considered to be the parent company’s expectations of the subsidiary. Hoenen and Kostava (2014) identify unresolved issues in HQ-sub relations, including closing the gap between headquarters’ expectations and subsidiary performance.

Reliance on Agency Theory: Scholars have considered two factors: the parent company’s compensation strategy and the subsidiary’s cultural distance as impacted the efficiency of the subsidiary (Roth & O’Donnell, 1996). While agency theory is useful, some have suggested that its application has been rather simplistic (Steinberg et al., 2016). Others have used the game theory or contingency theory. While in the former, which focuses on the pressure of global integration and local differentiation (Doz et al. 1981; Roth & Nigh, 1992), whereas the game-theoretical perspectives in which both the parent and the subsidiary are considered to be equal players, with each maximizing output through collaboration (Rossing, 2005; Koffman & Rossing, 2005). Roth and Nigh (1992) suggest that the effectiveness of the headquarter-subsidiary relationship is related negatively to the level of conflict and positively to coordination.

Subsidiary Decisions: Bjorkman and Piekkari (2009) show that subsidiaries with low language competence were controlled to a greater extent by centralization and formalization than units with high language competence. Mahlendorf and colleagues (2012) Suggest that the influence of headquarter-designed PMS on subsidiary decisions is higher when the compensation of subsidiary management is linked to the H.Q.’s Performance Management Systems. Much of the traditional literature on subsidiary has been critiqued, which took the “traditional ‘center-periphery view where the firm-specific advantages are developed and controlled by the parent company, while the foreign subsidiaries are the long-arm of the parent company in exploiting the firm-specific advantages in the local market (Wallerstein 1974).” New approaches to subsidiary development have focused on the observation that some subsidiaries have a strategic role in MNCs that reaches beyond their local undertakings (e.g., Étemad and Dulude, 1986; Bartlett and Ghoshal, 1989; Gupta and Govindarajan, 1994). According to Bartlett and Ghoshal (1991), a key change in strategy in MNCs is the building of multinational flexibility by relinquishing strategic roles to individual subsidiaries.

Subsidiaries’ Strategic Roles: As subsidiaries take on different strategic marketing roles, there is a greater need to effectively manage the relationships between the headquarters and the subsidiary’s marketing operations. From a relationship perspective, key success factors in cultivating successful relationships include the subsidiary’s trust in and dependence on the headquarters (Blau 1964; La Valle 1994; Makoba 1993; Morgan and Hunt 1994). However, much of this research has focused on fostering trust in the parent company rather than trusting and delegating responsibilities to the subsidiary. In this vein, scholars have also considered the determinants of subsidiary independence. The impact of knowledge out and inflow is shaped by subsidiary autonomy, corporate socialization, and the existence of electronic-based transmission channels, especially among media companies (Strube & Berg, 2011).

Conflict Management Strategies: Scholars have also considered the different conflict management strategies and their impact on parent-subsidiary cohesiveness. MNCs often face competing pressures of global integration and local responsiveness (Pahl & Roth, 1993). Knowledge flows are important not only in the media industry but in many other industries. One study by Najafi-Tavani and others (2014) how that the possession of strategic resources (knowledge or embedded relations) increases subsidiary influence only when the knowledge is transferred back to headquarters. This means that the integration of subsidiaries is impacted by the transfer of knowledge. What then are some of the implications of foreign-subsidiary relations on corporate innovation?

Leadership & Corporate Innovation

Corporate innovation is also considered in the context of networks between start-ups and established businesses to combine corporate activity and entrepreneurial activity (Weiblen & Chesbrough, 2015). More generally, some of the ingredients to promote innovation have been considered to be
the coordination of managerial roles, understanding the type of innovation being sought, and proper training and preparation of individuals (Kuratko et al., 2014). Between 2009 and 2017, a surge in the literature showed the intricate links between finance and corporate innovation, i.e., how resources were distributed and their impacts on innovation (He & Tian, 2018).

Innovation Explained Through Agency Theory: Innovation can also be understood through the agency theory, as compensation strategies and shareholding vary. Chang and colleagues (2015) considered the impact of non-executive employee stock options and corporate innovation, whereas others view innovation as linked to the executive’s compensation (Lin et al., 2011). Kerr and Nanda (2015) especially focus on the impact of debt financing on corporate innovation. Firm-level analysis has focused on the relationship between venture capitalism and entrepreneurship (e.g., Tian & Wang, 2014).

Firms’ Intricate Internal Networks Impact Innovation: Scholars have focused on the firm’s internal characteristics and their impacts on innovation, which is perhaps most useful for our study. Here the works of Malmendier and Tate (2005a, b) and Galasso and Simcoe (2011) are useful as they consider the impact of managerial overconfidence on innovation. In contrast, Hirshleifer and colleagues (2012) show that firms with overconfident CEOs invest more in R&D projects, which results in greater innovation. Others have considered CEOs’ sensation-seeking traits to impact innovation (Sunder et al., 2017).

Country Specific Impacts on Innovation: Some scholars have also thrown light on country-specific characteristics, such as how uncertainty around government policy impacts innovation (Bhattacharya, 2017), with the extensive literature on the social traits of each region and its impacts on innovation, where scholars have considered interesting intersections between risk-taking behavior shaped by cultural practices and innovation as well as the well the relationship between bribery and innovation. Some suggested that firms headquartered in countries with higher gambling propensities take higher risks. It has also been shown that those firms situated in countries where corruption is high often paid briberies, which positively relates to innovation (Ayyagari et al. 2014; Chen et al. 2014; Adhikari 2016).

Cultural Differences Affect Innovation: Such cultural differences fundamentally shape how we think about innovation as the relation between the parent company and the subsidiary. However, instead of viewing the parent company as a monolith, scholarship has shown how owners’ voices are much more competing than previously considered. Whereas some managers wanted internal innovation, others wanted external innovation (Hoskisson et al., 2017). How can these debates have a bearing on understanding foreign-subsidiary relations and their impact on ERP innovation? We can perhaps take the lead from Yuan and Wen (2018). They show that when managers have a greater foreign experience, the likelihood of having innovation is greater, leaving us to consider the nature of communications, i.e., how receptive the parent company is to the subsidiary’s needs, as the primary determinant of innovation. Huse and colleagues (2005) that a competitive environment in U.S. firms shapes corporate innovation. Fundamentally they consider how corporate innovation is shaped by foreign activity.

Internationalization Environment Impacting Innovation: They show that environment and internationalization are positively related to corporate innovation. Thus, the findings of the studies like these can in fact, be used to consider corporate innovation in the context of parent-subsidiary relations. Kayani & Nadeem (2015) took a step away from the identification of critical success factors that traditional ERP implementation literature focused on and showed how communication, culture, and inter-relationships of various factors intersected with the inter-relationship of managerial layers and led to complex relations and reduced innovation.

ERP Outcomes as an Addition to Literature: Existing literature is almost silent on the causality of the inter-relationships of the management and the ERP outcome, which is a gap this study seeks to overcome. Gandhi (2015) shows that Organizational Culture & Communication and Top Management Commitment and Support have high driving power and deserve serious attention in
ERP implementation process. Jenko and Roblek (2016) evaluate the effect of Primary human factors (PHFs) model on traditional CSFs and on the project success. Binkhatim and Bashir (2019) identify autonomous, dependence, linkage and independence as key factors in success. Other studies have focused on critical success factors such as management support and end user motivation (Ahmed et al. 2017). Yet others have strictly relied on the impact of leadership on ERP implementation (Liu & Fan, 2020). Others have focused on integration caused by ERPs as a cause of rapid innovation (Erkayman, 2018). There is another vein of literature which has focused on the unintended (mostly positive) consequences of a successful ERP implementation (Marcinauskas, 2021). Literature on the role of existing digital technologies and its impact on ERP implementation is recent (Marsudi & Pamudi, 2021). It is possible for key influencing factors for success to be different from national ERP vendors compared to the parent company (Alkraiji et al. 2020). What we observe is that none of these studies considers multiple factors such as management, consultants and digitization as influencing the outcome of ERP implementation. They are also parochial in this manner. Moreover, none of these studies emphasizes on parent-subsidiary relation as a factor influencing ERP innovation. How can we think about subsidiary innovation and its implications for the ease of ERP customization in the context of global organizations?

Sample

The study draws upon a sample of 18 projects in which Microsoft dynamic was implemented in companies located in different countries. These projects have been selected because there have been successful upgrades in all of them. All eighteen projects have completed the transition from an earlier ERP. Eight projects have been selected in Asia, 2 in Africa, 2 in South American, and 4 in Europe. This study will discuss the novel challenges ERP implementation and customization show about the complex relations between parent and subsidiary companies in the age of digitization and global organizations. Surveys were administered in each of the subsidiary and the parent company to assess i) resources devoted on each ERP module ii) attitudes toward training iii) attitudes toward customization or generic ERPs iv) frequency of the consultant’s engagement with the subsidiary vis-à-vis the parent company. All these factors were used to assess the quality of parent-subsidiary relations.

Hypotheses

To investigate how the relationship between the parent company and subsidiary impacts the implementation of an ERP to foster innovation, the paper will consider the specific combinations in which several factors interact to increase the variance in the implementation duration. The paper will test the following hypotheses:

1. Unequal distribution of resources across the four modules by the parent company led to delays in projects
2. The success rate was higher where the consultants were engaging with the subsidiary company. While engagement with the parent company was important, the quality of communication with the parent company did not override that of the subsidiary company.
3. The perception toward personnel training was similar among parent and subsidiary companies; the success rate was highest.
4. The success rate was lower when there was a gap in the preferences toward ERP customization (innovation) between the parent and the subsidiary company.
RESULTS

The paper will use crisp data to consider the variance in implementation duration by assessing the relationship between the following conditions (measured in 1 and 0).

1. Resource Allocation

   This condition has been generated by considering the amount of time spent on the first two modules compared to the remaining two modules. Where parent and subsidiary companies spent more resources on the initial modules, the completion was also delayed. One has been used for projects in which the completion of initial modules was within five months. 0 has been used for projects in which the completion of modules took longer than five months. When the parent company devotes too many resources on the primary stages of innovation, the result is that the effort required to successfully implement the final modules is compromised. The remaining two modules remain incompletely implemented or are abandoned. In other cases, it is possible for the implemented to be rushed without integrating one module with others and synchronizing their operations. Thus, for optimum results it is necessary for equal amount of resources to be dedicated in each phase of implementation.

2. Personnel Training

   Where the training was provided for two modules or greater and the attitude toward training in the parent company and subsidiary was 0.5 or above, the result was 1, otherwise 0. The impact of attitudes was greatest when perceptions toward training between the parent and the subsidiary company were
aligned. It is possible that the parent company supports required training for ERP modules, by this is not supported by the subsidiary. Based on survey responses, we know the attitudes toward training. Where the attitudes toward training is positive in the parent company, and negative in the subsidiary, we see that the fruits of training are not realized, and the staff only engages with the trainer half-heartedly. Due to the lack of adequate training, it is possible that while a technology has been implemented, the staff does not know the intricacies related to its usage. When training is provided for more than 2 modules, it provides personnel with enough knowledge to replicate existing knowledge or draw from them, to understand the modules for which they aren’t trained. Training for more than 2 modules also allows the employees to understand the synchronization of multiple modules. Where the training provided is for less than 2 modules, the knowledge about the implementation is insufficient and non-replicable to the understanding of the remaining modules. Further, when the parent company is insistent on training and the subsidiary is reluctant, the latter takes this as a sign of an over-bearing parent company, and thus complete benefits of training are not realized.

3. Relations Between Consultant and I.T. Department

Table 2. Projects and resource allocation

| Projects | Time spent on primary module/s (1 or 1 & 2) | Time spent on remaining modules | Crisp Value |
|----------|--------------------------------------------|---------------------------------|-------------|
| 1        | 8 months                                   | 5 months                        | 0           |
| 2        | 2 months                                   | 11 months                       | 1           |
| 3        | 2 months                                   | 11 months                       | 1           |
| 4        | 8 months                                   | 5 months                        | 0           |
| 5        | 3 months                                   | 10 months                       | 1           |
| 6        | 2 months                                   | 11 months                       | 1           |
| 7        | 3 months                                   | 10 months                       | 1           |
| 8        | 3.5 months                                 | 9.5 months                      | 1           |
| 9        | 9 months                                   | 4 months                        | 0           |
| 10       | 7 months                                   | 6 months                        | 0           |
| 11       | 4 months                                   | 9 months                        | 1           |
| 12       | 4.5 months                                 | 8.5 months                      | 1           |
| 13       | 5 months                                   | 5 months                        | 1           |
| 14       | 8 months                                   | 5 months                        | 0           |
| 15       | 8 months                                   | 5 months                        | 0           |
| 16       | 8 months                                   | 5 months                        | 0           |
| 17       | 7.5 months                                 | 5.5 months                      | 0           |
| 18       | 2.5 months                                 | 10.5 months                     | 1           |
When the consultant’s engagement with the I.T. of the subsidiary was greater than the engagement with the parent company, the results on project completion were positive. If engagement with subsidiary I.T. is greater than 0.5, the crisp value is 1, otherwise 0. Similar engagement among consultants with subsidiary and parent has negligible impact. The third condition is that in some cases it is possible for the consultant to be under pressure to report frequently to the parent company even when he or she is deployed in the subsidiary. What happens therefore is that the consultant is under pressure to report to the parent company, which makes him or her oblivious to the needs of the subsidiary. When the consultant engages more frequently with the subsidiary, the results on innovation are much more likely to be positive. It is possible that the consultant faces greater pressure to report from the parent company. In this case, the consultant does not fully appreciate local conditions and does not alter his solutions to adjust to the environment by remaining focused on satisfying the parent company. As he focuses on the parent company to report his performance, he inevitably fails to understand or fully appreciate the situation within the subsidiary.

4. Innovation (Customization or Generic):

The attitude toward customization was positive in the parent company and lower in the subsidiary, the impact on project completion was negative, and the crisp value assigned was 0. The same is true when the subsidiary has a positive attitude toward customization, and the subsidiary’s view is negative. Whereas if perceptions toward customization are more or less, the crisp value is 1. Perceptions toward customization were necessary based on preliminary analysis, as there was not a single project for which the crisp value was 0 and the outcome was 1, unlike all other conditions. Another condition to measure the IV is whether the parent company wants generic ERPs. It is important to keep in mind that when the parent company wants a generic ERP, it wants the same platform for all the subsidiaries,
instead of attending to local contingencies. In some cases, it is likely that the subsidiary demands customization based on local needs, whereas the parent company wants generic platforms. This is the example of the parent company over-exerting itself on the subsidiary. This is another example of how parent-subsidiary relations can be worsened. While it is useful for the parent company to standardize its operations, it prevents the subsidiary from fully incorporating its local requirements into its ERP customizations.

The factors and their impact on the variation of implementation in terms of the duration (days planned compared to actual days) will be analyzed through Qualitative Comparative Analysis. Based on the variables which will be tested against time variance, a crisp table was created. When the overrun was within 40% from the start of the project to Go-Live, the crisp value was 1, whereas if it was higher, the value was 0. Following Fiss (2007) and Fiss (2011), I will be creating a table with several variables. I will be studying the combinations and permutations of variables that have

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Table 4. Consultant and IT department relations

| Projects | Consultant engagement with IT (Subsidiary) | Consultant engagement with IT (Parent) | Crisp Value |
|----------|---------------------------------------------|----------------------------------------|-------------|
| 1        | 0.1                                         | 0.9                                    | 0           |
| 2        | 0.9                                         | 0.3                                    | 1           |
| 3        | 0.8                                         | 0.2                                    | 1           |
| 4        | 0.2                                         | 0.9                                    | 0           |
| 5        | 0.7                                         | 0.4                                    | 1           |
| 6        | 0.7                                         | 0.5                                    | 1           |
| 7        | 0.9                                         | 0.3                                    | 0           |
| 8        | 0.6                                         | 0.4                                    | 1           |
| 9        | 0.3                                         | 0.9                                    | 0           |
| 10       | 0.8                                         | 0.5                                    | 1           |
| 11       | 0.9                                         | 0.5                                    | 1           |
| 12       | 0.9                                         | 0.5                                    | 1           |
| 13       | 0.8                                         | 0.4                                    | 1           |
| 14       | 0.4                                         | 0.9                                    | 0           |
| 15       | 0.4                                         | 0.8                                    | 0           |
| 16       | 0.4                                         | 0.6                                    | 0           |
| 17       | 0.4                                         | 0.8                                    | 0           |
| 18       | 0.9                                         | 0.4                                    | 1           |
the greatest impact on reducing overruns. These combinations will allow me to test the hypotheses described above. An example of the Crisp Set is given below.

Table 5. Innovations

| Projects | Attitudes toward customization in the parent company | Attitudes toward customization in the subsidiary | Crisp Value |
|----------|-----------------------------------------------------|-------------------------------------------------|-------------|
| 1        | 0.1                                                 | 0.9                                             | 0           |
| 2        | 0.9                                                 | 0.9                                             | 1           |
| 3        | 0.9                                                 | 0.8                                             | 1           |
| 4        | 0.9                                                 | 0.1                                             | 0           |
| 5        | 0.6                                                 | 0.6                                             | 1           |
| 6        | 0.5                                                 | 0.5                                             | 1           |
| 7        | 0.4                                                 | 0.4                                             | 1           |
| 8        | 0.3                                                 | 0.3                                             | 1           |
| 9        | 0.9                                                 | 0.1                                             | 0           |
| 10       | 0.8                                                 | 0.9                                             | 1           |
| 11       | 0.4                                                 | 0.4                                             | 1           |
| 12       | 0.6                                                 | 0.7                                             | 1           |
| 13       | 0.8                                                 | 0.8                                             | 1           |
| 14       | 0.2                                                 | 0.8                                             | 0           |
| 15       | 0.8                                                 | 0.3                                             | 0           |
| 16       | 0.1                                                 | 0.9                                             | 0           |
| 17       | 0.2                                                 | 0.8                                             | 0           |
| 18       | 0.6                                                 | 0.6                                             | 1           |

**DISCUSSION**

**Time and Resource Allocations**

Regarding resource allocation, we observe that when the time spent on the first module was higher than 5 months, it led to less time for the remaining modules. The time and resource allocation during the first period included both companies implementing the first two modules simultaneously and those which implemented one module alone. When resources and time allocation were evenly divided, its impact on the outcome was the highest. While uneven distribution impacted the chances
of completion, project 10 showed that even if there was an uneven distribution, the problem could be overcome if the remaining conditions were present. Among projects where the distribution was uneven, there was only a 12.5% probability of success out of the total number of failed projects, that too, if the remaining conditions were present. Thus, about the first hypothesis, i.e., unequal distribution of resources across the four modules by the parent company led to delays in projects, we can conclude that there was a minimal chance of success. However, the possibility of success can not be ruled out entirely. The importance of the condition, i.e., the even distribution, can thus be compared with other conditions and considering the conditions under which even the absence of even distribution can result in positive outcomes.

**Failure of Projects**

There were five projects which were completely abandoned or failed. It is important to consider the factors that led to the failure. In some cases, we know that when none of the four factors were available the project had a 100% probability of failing. Thus we can even use project # 1, 4, 9 & 14 and 16 as controls to test whether the four variables together shape the outcome or not. However, there are exceptions such as 15 and 17 where one condition is present and yet the outcome is negative. In both cases, the factor that is present is the training to personnel. Thus we know that training in the absence of other factors is likely to have negligible impact on the likelihood of success. Conversely, even when training is missing and the remaining factors are present, the it is possible for the project to be successful, as in 18, 11, 6, 5 and 3. Thus we can understand the complimentary role of training

Table 6. Example of crisp set

| Projects | Resource Allocation | Personnel training | Consultant IT Dept | Innovation | Outcome |
|----------|---------------------|--------------------|--------------------|------------|---------|
| 1        | 0                   | 0                  | 0                  | 0          | 0       |
| 2        | 1                   | 1                  | 1                  | 1          | 1       |
| 3        | 1                   | 0                  | 1                  | 1          | 1       |
| 4        | 0                   | 0                  | 0                  | 0          | 1       |
| 5        | 1                   | 0                  | 1                  | 1          | 1       |
| 6        | 1                   | 0                  | 1                  | 1          | 1       |
| 7        | 1                   | 1                  | 0                  | 1          | 1       |
| 8        | 1                   | 1                  | 1                  | 1          | 1       |
| 9        | 0                   | 0                  | 0                  | 0          | 0       |
| 10       | 0                   | 1                  | 1                  | 1          | 1       |
| 11       | 1                   | 0                  | 1                  | 1          | 1       |
| 12       | 1                   | 1                  | 1                  | 1          | 1       |
| 13       | 1                   | 1                  | 1                  | 1          | 1       |
| 14       | 0                   | 0                  | 0                  | 0          | 0       |
| 15       | 0                   | 1                  | 0                  | 0          | 0       |
| 16       | 0                   | 0                  | 0                  | 0          | 0       |
| 17       | 0                   | 1                  | 0                  | 0          | 0       |
| 18       | 1                   | 0                  | 1                  | 1          | 1       |
when other conditions are present. In fact, training when there is disagreement between the parent company and the subsidiary may even give the impression of an over-bearing parent company and thus have a negative impact.

**Specialization of Labor**

However, in terms of the second condition, i.e., required training for each of the four modules, the study compared perceptions toward training in the parent company and the subsidiary. While the presence of positive perceptions toward training did have a substantial impact on the success of the implementation, there were still some outliers. Yet the important thing is observed here is that the impact on the completion of the project was lowest when there was a higher difference in perceptions toward training in the parent company vis-à-vis the subsidiary. Even if attitudes toward training were uniformly low in both the parent and the subsidiary company, it was possible that the net impact of training did not adversely impact the chances of project completion. Conversely, the opposite could also be true, i.e., the lack of positive perceptions, adversely impacting the outcome, as in case 9. However, the impact of personnel training did not have as much an impact on the chances of success as resource allocation, as there was a 50% probability in projects where there was a gap in perceptions toward training or negative perceptions shared by both the parent and the subsidiary, for the project to succeed still. Thus we can say that perception toward personnel training was similar among parent and subsidiary companies; the success rate was higher, but the impact of training was nominal. Thus, it is important to consider other factors that had a higher impact.

**Agency of the Consultants**

In terms of consultant engagement with the I.T., the most significant impact on the project’s success was a greater engagement frequency with the subsidiary than the parent company. The parent company was much more inclined toward shifting to ERP to newer Microsoft ERP, while the latter had already been customized based on the needs of each subsidiary. Implementing MS ERP was shaped by the need to standardize processes when each subsidiary had specific needs. In this context, where the consultant directly engaged with the parent company, it greatly impacted the success of the implementation. There was only one case in which the consultant engaged much more frequently with the parent company, and the outcome was still positive. There was a 12.5% probability that the consultant would have more frequent engagement directly with the parent company instead of the subsidiary, and the outcome would still be positive. This means that the consultant’s engagement with the subsidiary seems to be as important as resource allocation in determining the project’s success.

**Like / Unliked mindedness of Parent & Subsidiaries**

Finally, the gap between parent and subsidiary or the low rates of perceptions toward customization also impacted the chances of success. The impact was greatest when the interests related to customization aligned and least when there was a difference or a low optimism about innovation in the parent company. Even if perceptions were low, they did not impact the success as significantly as have a difference in opinion. In the projects which failed, there was none in which interests related to customization were shared, in that either that parent company was interested or the subsidiary in ERP innovation. Interestingly there was a 100% probability of the project to fail if the interest in innovation did not align between the parent company and the subsidiary.
Below is a table summarizing the outcomes of a combination of conditions to assess, The failure of projects in the absence of the four conditions and success when the four conditions are present demonstrate the role played by these conditions in ensuring optimum performance across subsidiaries. From the table, we can assess that while it was possible for cases to be successful, albeit rarely, in conditions such as the i) absence of training ii) the absence of engagement of consultant with subsidiary iii) and uneven distribution, yet it was possible for the outcome to be positive when there was a disjunction between the parent company and the subsidiary’s attitude toward ERP innovation.

Based on these estimations, we can now assess which combination of conditions is more likely to impact the chances of success positively. What then are the specific problems encountered by subsidiary-based innovation related to ERP customizations? Often there are specific needs of operations in each country.

**CRM at the Core of Innovation**
Customer relationship management is an important aspect of enterprise resource planning, and adequate information sharing and the gathering of necessary data can have positive outcomes in
shaping product innovation. This research showed that taking subsidiary-based innovation based on customer perceptions even impacted product diversification to adjust to the needs of the market. Thus, innovation is related is not only related to the use of platforms and their customization (Quin & Baruch, 2014), where parent company and subsidiaries often conflict, but also its impact on products, managerial processes, and productivity. Ernst and colleagues (2011) show that customer relationship management aids new product development. Second, supply chain management and procurement are other areas where subsidiary-based innovation has shown advantages. Subsidiaries in the developing world had to demonstrate much greater flexibility due to bureaucratic structures. Thus innovation was directly related to flexibility in engagement with government and non-government actors. Davison (2002) has succinctly shown that when the ERP system is upgraded, the organization will need to go through all the modifications again. However, as the subsidiary adopts customization, it must restructure its internal processes to match the ERP system. This is something that the parent company in the study particularly feared and thus kept a closer check on not only customizations, encouraging the adopting of generic ERPs to increase predictability, but also its possible spillover impacts on the subsidiary and its impacts on the parent company to maintain control over the subsidiary.

**Culture a Predictor or Unpredictable Variable**

There is literature showing the specific needs of societies and their impact on the need for customization. For instance, Davison (2002) argues, “ERP systems are typically not geared to produce user-specific reports, since they are designed to function in an online, up-to-the-minute environment where reports are a thing of the past.” Soh and colleagues show that such reports are often necessary in the bureaucratic societies of Southeast Asia for government departments and agencies, as well as internal process review and control procedures (Soh et al. 2000). This is one specific example of how cultural needs shape the need for ERP innovation. Such needs pervade other areas, such as supply chains and procurement. For instance, in the case of procurement in countries where payments are made after service delivery, there is an increasing need to adjust management and financial accounting, which may not be in line with the use of online services as in western countries. Since this study used data from subsidiaries in a wide range of countries, it was also observed that as the cultural and linguistic distance from the country where the parent company was situated, there was also increasing pressure for standardization, and it was in such countries that failure was most likely. Under these circumstances, consultants were also under increasing pressure to report to the parent company, and the engagement required with the subsidiary to successfully upgrade and implement new modules was missing.

Thus, one may say that innovation and the question about whether the parent company encourages customization, is also linked with its increasing demands on the consultants to share as much information with the parent company, although this could also occur independently. Parent companies ignored that the ERP innovation could improve information sharing between the parent company and subsidiary, which has also been discussed by Seethamraju and Seethamraju (2008).

**Moving 18 Foreign Subsidiaries to a Generic System, can Innovation be Lost in Transition?**

Methodologically the study helps understand why the parent company treats many subsidiaries differently. The way parent-subsidiary relations when cultural distance is greatest, result in greater rigidity of the parent company, which prevents ERP innovation, which could, in reality, enhance flexibility in terms of product diversification, customer relation, procurement and supply chains in the subsidiary, and thus even make the organizational structure more dynamic but continuously adjusting to changes in ERP. This could then result in what can be termed as subsidiary-based innovation, in which the parent company could use subsidiaries that are more distant as a source of innovation.
CONCLUSION

Understanding the Roles

Based on a study of the relations between a single parent company and its subsidiaries located in many different parts of the world, this study has assessed four factors and how they relate to each other and have a positive role in ensuring the successful completion of ERP up-gradation. The study has considered these conditions to include the even distribution of resources in implementing ERP modules, the perceptions toward training in the parent company and the subsidiary, the difference in attitudes toward customizations, and the quality of consultant’s engagement with the parent and the subsidiary company.

18 Projects Translated into Crisp Set

The study gathered data through surveys and then translated the figures into crisp data sets from fuzzy data based on survey responses. The study showed that all four conditions interacted with each other dynamically and played some role in shaping the outcome. However, the most important condition was whether the parent company and the subsidiary company were aligned for the customization of ERPs. When this was not the case, the likelihood of the project failing was the greatest. Second, although the two factors, namely, uneven distribution of time and resources and consultant’s engagement with parent company over subsidiary were crucial for the successful completion of ERP implementations, it was still possible for the project to be successful in the absence of any of the two factors. Using this analysis of 18 subsidiaries, the study showed that cultural and linguistic differences made the parent company more rigid in its approach when subsidiary-based innovation could be used as a resource.

Innovation at the Core of System’s Success

The study showed that where subsidiary-based innovation is encouraged, it allows greater product diversity and more dynamic organizational behavior, which rapidly adjusts to changing circumstances. It provides lessons for the parent company to absorb in its global strategy.

Call for Future Research

Starting the discussion of predicting ERP success by measuring managerial alignment to discover the ERP Innovation achieved by avoiding cost overruns would be the starting point of a much-needed discussion. Future research can also be directed towards QCA fuzzy set with possibly dissecting further into some of the potential conditions such as reworks or reconfigurations in ERP predicts faultlines between the managerial cross-functional levels, Internal business analyst and Subsidiary’s I.T. department can be causal to unit-level misalignments.
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