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INTRODUCTION

The intellectual contribution of business schools aims at theory as well as practice. The four papers featured in this issue advance theoretical knowledge while impacting management practice. They meet the four principles of what has been termed *pragmatic rigor*: relevance, actionability, comprehensibility, and ethical reasoning[1]. By connecting research and real case problems, the papers are relevant to managers, business leaders, and decision-makers. They suggest precise actions that can be implemented by organizations to address issues of competitiveness and growth. They are comprehensible and easily understood by a target audience and beyond. The papers include ethical considerations as they ponder the impact of their findings on diverse stakeholders, including society as a whole. By complying with these four principles, the papers provide a significant contribution to the debate on engaged scholarship.

Sara Sadvandi and Daphne Halkias acknowledge the fact that autonomous vehicles will become staples of future means of transport. Their findings indicate the need to increase public awareness of the benefits and limitations of self-driving cars. To gain users' trust, the authors recommend that vehicle manufacturers and governments work closely together.

As companies are increasingly using the SaaS (Software as a Service) business model, **Benjamin Cohen and Michael Neubert** explore the critical factors that underpin the valuation of SaaS companies and call for a reassessment of traditional evaluation metrics.

Matthew Andrews and Stanley Smits analyze the synergy between tacit knowledge exchanges and the effectiveness of teamwork in organizations. They suggest practical actions to improve this connection.

Fouad Kazim assesses the challenges faced by managers when introducing digital transformation in their organizations. The findings of this study suggest that, for digital transformation to be effective, business leaders and operational managers need to adapt their management styles and adopt agile and inclusive cross-functional methodologies.

A most sincere thanks to all who contributed to this issue.

Enjoy the reading!

César Baena

Editor-in-chief
Dean and Director of Doctoral Research, ISM

[1] Robey, D., Taylor, W., & Grabowski, L. (2018). Pragmatic rigor: Principles and criteria for conducting and evaluating practitioner scholarship. *Engaged Management Review*, 2(3).

CONTENTS

INTRODUCTION
César Baena 1

CHALLENGES OF HUMAN FACTORS ENGINEERING IN THE COMING TRANSITION TO AUTONOMOUS VEHICLE TECHNOLOGIES: A MULTIPLE CASE STUDY
Sara Sadvandi and Daphne Halkias 3

HOW DO CORPORATE VALUATION METHODS REFLECT THE STOCK PRICE VALUE OF SAAS SOFTWARE FIRMS?
Benjamin Cohen and Michael Neubert 9

USING TACIT KNOWLEDGE EXCHANGES TO IMPROVE TEAMWORK
Matthew Andrews and Stanley Smits 15

DIGITAL TRANSFORMATION & LEADERSHIP STYLE: A MULTIPLE CASE STUDY
Fouad A. B. Kazim 24

MEMBERS OF THE EDITORIAL BOARD 34

Challenges of Human Factors Engineering in the Coming Transition to Autonomous Vehicle Technologies: A Multiple Case Study

AUTHORS: SARA SADVANDI AND DAPHNE HALKIAS

Abstract

The development of autonomous vehicles has significantly accelerated in recent years, partially because it is becoming technically more feasible but also because many significant benefits of this technology could be offered to society. This article is based on a qualitative multiple case study focusing on the challenges brought forth by human factors engineering in the coming transition to autonomous vehicle technologies, such as public perceptions, market acceptance, and safety issues. The units of analysis were subject matter experts' insights on the topic of study. The results of this article focus on improving the image that people have of self-driving cars and on increasing awareness of the benefits and limitations of autonomous vehicles. In conclusion, manufacturers are encouraged to work with the government in order to increase people's trust regarding safety. To reach a high level of acceptance, it can be assumed that further research is required in order to learn more about concerns and to build solutions that take into account the needs and worries of the end-user customer.

Keywords: autonomous vehicles, self-driving cars, technology, policy making, transportation safety

Introduction

Today, the automotive industry is facing significant changes which not only could influence the design of vehicles but also revolutionize their interaction with humans and reshape the design of roads and cities (König & Neumayr, 2017; Silberg et al., 2012). The rise of self-driving cars has the capacity to bring about significant improvements to fuel efficiency, time, safety, and general mobility by removing the driver from the equation (Douma & Palodichuk, 2012). Yet, a strong air of uncertainty surrounds the introduction of this profoundly new and different technology; all stakeholders may not be welcoming of such change (Kyriakidis et al., 2017). Rather than concentrating on the attitudes that users hold towards self-driving cars in terms of perceived concerns and benefits, prior studies have instead commonly consulted experts instead of the public or used a generally narrower focus (König & Neumayr, 2017).

Background

Automated vehicles are defined as those motor vehicles capable of automated driving and navigation without direct human assistance. The origins of autonomous vehicles can be traced back to the late 1920s when Achen Motor, a distributor of cars in Milwaukee, first demonstrated phantom motor vehicles. Since then, other car manufacturers, universities, and also electronics companies have experimented with automated vehicles with limited success (Waugh, 2013). In fact, the literal acceleration of self-driving car technology took place when the US government sponsored the Defense Advanced Research Projects Agency (DARPA) Grand Challenge in 2004. DARPA presented the first long-distance competition for driverless cars, offering one million dollars to the team that could create an autonomous vehicle capable of finishing a 150-mile course. This challenge attracted more than 100 teams in its first year (Thrun et al., 2006).

Statement of Problem

The problem is that challenges, such as public perceptions, market acceptance, and safety issues, brought forth by human factors engineering in the coming transition to autonomous vehicle technologies have still not been fully addressed by the automotive industry (Borenstein, Herkert, & Miller, 2017; Kyriakidis et al., 2017). Human factors engineering refers to a discipline of applying human characteristics, limitations, and capabilities to the design of systems,

processes, and products. The primary goals are to reduce human error and enhance the safety and productivity of the interaction between humans and machines and their environment (Chapanis & Holstein, 2017).

Purpose of Study

The purpose of this qualitative multiple case study was to document and describe the key insights of subject matter experts (SMEs) on the challenges brought forth by human factors engineering in the coming transition to autonomous vehicle technologies, such as public perceptions, market acceptance, and safety issues. A multiple-case design was used to satisfy the goal of this descriptive case study (Yin, 2017) on research on human factors and public perceptions regarding autonomous vehicles as well as human factors engineering in the coming transition to autonomous vehicle technologies.

Nature of Study

The nature of this study was qualitative. A multiple-case design by Yin (2017) was used to understand the human factors and public perceptions regarding autonomous vehicles as well as human factors engineering in the coming transition to autonomous vehicle technologies. The units of analysis were SMEs on the topic of the study. Implementing multiple units of analysis provides the ability to analyze compound current events in detail from their perspective and reduce limitations of such analysis in comparison to the survey or trial designs (Yin, 2017).

Literature Review

The scope of this literature review covers scientific research related to the expectations and market perceptions of autonomous vehicles. The literature reviewed was considered from an international perspective while focusing mostly on French and US markets. It offers an overview of autonomous vehicles as a concept in industries from the 1920s to the most recent years. Within the scope of the literature review, there is also a critical analysis of the challenges brought forth by human factors engineering in the coming transition to autonomous vehicle technologies, such as public perceptions, market acceptance, and safety issues.

Theoretical Framework

Market acceptance and public perception are core elements for successful integration of the autonomous vehicle in the international market. General acceptance, described as "willingness for something" (Fraedrich & Lenz, 2016, p. 22), refers to the process of agreement by someone or something. In the context of autonomous vehicles, Franken (2007) described market acceptance as "a positive attitude on the part of a user or decision-maker towards accepting a thing or situation" (p. 3) and mentioned that acceptance contains a positive aspect. Franken (2007) divided acceptance into two components:

- Attitudinal acceptance: emotions and experience;
- Behavioral acceptance: an observable behavior or perception.

Adell (2009) offered a more specific definition for acceptance in the context of driver assistance systems (DAS) as follows: "the degree to which an individual intends to use a system and, when available, to incorporate the system in his/her driving" (p. 31).

Theoretical foundations of acceptance: In the context of automated vehicles, various theoretical models are applicable in explaining their impact on market acceptance and public perception (Venkatesh, Morris, Davis, & Davis, 2003). These theoretical models, listed below, are derived from the theory of planned behavior, an approach that describes human behavior based on public perceptions of situational factors, social influence, and a human value system (Ajzen, 1991):

- Theory of planned behavior (Ajzen, 1991)
- The technology acceptance model (Davis, 1989)
- The unified theory of acceptance and use of technology (Venkatesh et al., 2003)
- Model of acceptance of driver assistance systems
- Model of acceptance of fully autonomous driving systems (Kelkel, 2015)

Human Factors and Market Perception

The interaction between humans and automated vehicles is not yet resolved and requires more research. The challenges include the impact of automated driving on human driver mental workload, its situation awareness, as well as human acceptance, reliance, and trust of automated systems (Brookhuis, van Driel, Hof, van Arem, & Hoedemaeker, 2008; de Waard, van der Hulst, Hoedemaeker, & Brookhuis, 1999; de Winter, Happee, Martens, & Stanton, 2014). Further challenges are related to significant changes in human behavior due to system automation (Gouy, Nibouche, Hoarau, & Costet, 2014). Examples of this include the necessary skills that humans should have to perform the driving task manually and the role of the human in an emergency situation such as exceeding limits or automation failure (Levitan & Bloomfield, 1998).

Public opinion and consumer behavior: Studies indicate that the next generations will be early adopters of driverless vehicles; they will be more interested in the new technology (Abraham et al., 2016). According to Kelley Blue Book, the high cost of autonomous vehicles is the primary reason that 57% of the next generation would not welcome the self-driving cars (Duffer, 2016).

User resistance: Prior studies on automated vehicles were not focused on users' attitudes towards self-driving. Bekiaris, Petrica, and Brookhuis (1997) were among the first to investigate user needs and acceptance of technology. Later research continued to evaluate psychological barriers and attitudes towards self-driving cars (Silberg et al., 2012).

Research Methods

Population: The sample for this study was first recruited from two population groups: 1) practitioners working in the automotive industry and, in particular, in the area of autonomous vehicles, and 2) scholarly researchers who have published papers on autonomous vehicles as a disruptive technology and innovation in peer-reviewed scientific journals.

Sampling criteria: An SME in this study is defined as an academic scholar or operational expert who has conducted complex projects or published in-depth research studies on the challenges of human factors engineering in the integration of autonomous vehicle technologies in society.

Material: Semi-structured interviews have a protocol of open-ended questions based on the central focus of the study for data collection of specific information on a participant's expert knowledge (Patton, 2014).

Data collection: Semi-structured, open-ended interview questions were developed as one method to fulfill the aim of the study, along with appropriate data gathering methods designed to facilitate accurate and efficient collection.

Validity and reliability: Construct validity is enhanced by using more than one source of evidence during data collection and by establishing a chain of evidence at the same time. Two main strategies were proposed to ensure construct validity: 1) triangulation, which means observing phenomena from different perspectives, and 2)

establishment of a clear chain of evidence that would allow the reader to follow how the researcher proceeded from the initial propositions to the final ones (Gibbert, Ruigrok, & Wicki, 2008).

Results of Study

The participants' responses to the interview questions provided insights into the study's three questions and were analyzed thematically for both consistent and divergent views. This thematic analysis was synthesized with data from the extant literature, the investigator triangulation process, and the researcher's observational field notes to provide answers to the research questions.

The findings of this study presented four themes that correspond to Research Question 1 (RQ1), four themes corresponding to Research Question 2 (RQ2), and four themes corresponding to Research Question 3 (RQ3). Accordingly, the following discussion of implications addresses each of these in turn.

RQ1: What are the insights of subject matter experts (SMEs) regarding the challenges faced by the automotive industry in terms of general public perceptions of autonomous vehicles?

The public's fear of accidents. The first discovery for RQ1 is that the public is worried about the abilities of this technology. They believe that artificial intelligence can do many things better than humans, but autonomous objects may potentially become very dangerous (Zhao, Dimovitz, Staveland, & Medsker 2016). All participants agreed that these vehicles can bring significant improvements to transportation safety and have environmental benefits. The second discovery is that current infrastructure has to be optimized for the use of autonomous vehicles in order to reduce accidents (Venkatesh et al., 2003).

Fear of computer/machine domination over humans. All the participants were concerned about the possibility of malfunction that could cause the vehicle to act unpredictably. Furthermore, one of the participants stated that the autonomous vehicle could be hacked the same way any other computing device can. As all participants stated, the least attractive characteristics of autonomous vehicles are related to safety and privacy regarding how the necessary data are collected, stored, maintained, and used.

The initial high cost. Based on the findings of this study, cost is one of the main challenges when considering the marketing of autonomous vehicles to the general public. The high costs of self-driving cars are due, firstly, to all the autonomous services provided via new sensors and technical features in the car (Dixit, Chand, & Nair, 2016) and, secondly, to the communication with infrastructure that autonomous vehicles rely on like detailed maps of cities and their surroundings for orientation.

The fear of killing someone. Worries regarding the fear of killing someone can also be related to lack of trust (Abraham et al., 2016). The findings of this study show that the general level of trust in machine driving is limited. In this context, it was reported that, within the reviewed studies, the majority of participants were concerned that self-driving vehicles may drive as well as human drivers but that their reactions in hazardous and unpredictable situations are not clear.

RQ2: What are the insights of SMEs regarding the challenges faced by the automotive industry in terms of market acceptance of autonomous vehicles?

Start by introducing the technology to new drivers. As most of the participants stated, it is essential to motivate and educate future users to reduce their fear of this new technology (Alaieri & Vellion, 2016). Fear is a defense mechanism; it will gradually decrease as the public discovers that there is no threat. As mentioned by some of the participants, assistive-driving technology and autonomous vehicle features can easily be marketed to new drivers if introduced from driving school.

Use social media to ease the acceptance process. All the participants believed that user acceptance is a prerequisite for the successful introduction of autonomous driving to the market. The autonomous vehicle industry has to investigate the process of getting users to agree with, approve of, or acknowledge the technology via the media (Fraedrich & Lenz, 2016). Findings for RQ2 are that media and communication technologies are considered to be of central importance for reducing uncertainty, and thus the future success of autonomous vehicles.

> **"Public perception and user acceptance need to be taken carefully into account in order for autonomous vehicles to be successfully introduced to the market."**

Initially offer free products and training. The main finding of this section for RQ2 is that the autonomous vehicle industry has to further investigate the possible behavioral changes that might come with the implementation of autonomous vehicles because they will play an important role in societal acceptance (Trappl, 2016).

Leverage people's relationship with the act of driving to support the acceptance process. The final finding for RQ2 is that the higher the level of vehicle automation, the more the driving task is shifted from driver to system. Some participants were worried that, due to the introduction of fully automated driving systems, drivers might feel deprived of enjoyment and the feeling of being in control.

RQ3: What are the insights of SMEs regarding safety issues in relation to human factors engineering in the coming transition to autonomous vehicles?

Improve road safety with rebuilt transportation infrastructure. As most of the participants noted, automated driving is a key technology for future mobility and quality of life, and, consequently, transport policy should be adopted for automated driving. Autonomous vehicles deal with drivers and infrastructure, and they have relative importance for road safety.

Start with assistive technology initially, and then move to fully autonomous vehicles. As most of the participants stated, autonomous services have to be integrated into society progressively. Therefore, starting with assistive-driving features can lead to a smoother adoption of fully automated vehicles.

Lawmakers' cooperation with the automotive industry to change motor vehicle laws. In the near future, driving rights will be delegated to autonomous vehicles. However, it is necessary that autonomous vehicles obey social and road rules. As mentioned by all study participants, to develop and deploy highly or fully automated cars into market-ready vehicles, there are many non-technical challenges, including legal ones.

Future predictions of SMEs for driving in 2030. The final finding for RQ3 is that automated driving has a fundamental economic and social impact on society. Some of the participants said that self-driving cars will not be mature enough to be in the market and used by the public in 2030. They believed, however, that large numbers of freight

vehicles will be equipped with self-driving functionalities and driver assistance functions. One of the participants mentioned that some public services such as buses or other forms of public transportation will be automated, but automated highway driving will not be in place by 2030.

Recommendations and Conclusion

This study found that autonomous vehicle technology is rapidly moving forward with little attention to market acceptance. However, it has significant impacts on reducing accidents, decreasing parking demand, increasing fuel efficiency, improving road capacity, and optimizing mobility for non-drivers. With the mass penetration of autonomous vehicles, travel behavior might change in a way that will impact the economics of transportation.

Recommendations for Practice

- The automotive industry should further assess the public perception and attitudes towards highly/fully automated vehicles.
- The automotive industry has to gain a clearer image of what the self-driving car entails by promoting and showing all of its benefits.
- Manufacturers should start communicating early to get people used to automated vehicles before they go to market.
- Manufacturers should be transparent by showing the number of kilometers tested and by making accidents public.
- The media can be an effective way to demonstrate the technology, and car manufacturers should provide real-life demonstrations.

Recommendations for Future Research

- Additional insights can be gathered about the future development of autonomous vehicles and their integration into society with further analysis of additional case studies.
- More in-depth research should be pursued, particularly with samples of end-user customers.
- Further in-depth studies will contribute to an understanding of how self-driving cars can be evaluated through a human-centric approach.
- A broader number of participants and SMEs should be considered for future studies.

Conclusion

The focus of this study was to introduce self-driving vehicle technologies and their barriers. Public perception and user acceptance need to be seriously considered, so autonomous vehicles can be successfully introduced to the market.

The results of this study focused on improving the image that people have of self-driving cars and on increasing awareness of the benefits that autonomous vehicles offer. Additionally, manufacturers were encouraged to work with the government in order to increase people's trust regarding safety. Governments should focus on taking preparatory measures to ensure that potential issues are resolved in a timely manner, as was suggested by multiple interview participants. Problems such as ethical dilemmas and regulatory changes can be sufficiently addressed at this time, and potential infrastructural adjustments can be implemented for the future. A lack of knowledge about this new technology plays an important role in market acceptance and trust. Future research could also target the impact of user acceptance on the environment.

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How Do Corporate Valuation Methods Reflect the Stock Price Value of SaaS Software Firms?

AUTHORS: BENJAMIN COHEN AND MICHAEL NEUBERT

Abstract

This paper seeks to identify the critical factors determining the valuation of SaaS companies. This newly created business model renders many evaluation metrics inapplicable. This creates a unique sub-industry of such companies for corporate valuation purposes. Salesforce.com is used as the focal company of evaluation, allowing use of and reference to actual data and prices. This paper aims to evaluate the accuracy and relevancy of specific valuation techniques and identify those best suited for a SaaS company. This study uses a single case study research design, allowing for a deeper level of analysis. This paper has found that standard valuation techniques were successfully able to evaluate a stock share price using quarterly financial data. The relative valuation efforts were unable to derive a price range for the company. The peer analysis showed the importance of key factors like growth, profitability, or lifecycle phase, which becomes evident in the calculated metrics. The calculations performed in this paper shed light on the level of disconnect within the SaaS business model and standard valuation techniques. Companies experiencing higher growth will not compare well with companies of greater profitability. This paper brings momentum to defining an improved relative valuation metric that more robustly represents the value forecast of a SaaS company, provides technical support for the valuation of SaaS companies, and furthers the discussion of creating new valuation metrics for fast growth start-up firms.

Keywords: SaaS, software as a service, corporate valuation, international finance, global marketing, international business, pay-per-use, pricing strategy, software industry, cloud-based software

Introduction

The accurate valuation of companies is vital to ensure that stock markets are reliably efficient and that merger, acquisition, and divestiture events are handled fairly and appropriately. Without this fundamental expectation, stock market volatility and liquidity would suffer. However, not all industry segments can be evaluated using the same criteria, nor will analyst companies fully adhere to the same set of valuation criteria. Due to these factors, as well as overall global economic stability and individual market crises, a multitude of valuation metrics and processes have been developed and continue to evolve through the emergence of new business industries and business models.

In particular, the emergence of companies employing the new software as a service (SaaS) business model has created a disconnect between the valuation methods used within this sub-industry and elsewhere. Because this collection of companies has flourished in recent years, thus becoming permanent additions to the corporate landscape, the valuation techniques warrant further understanding. By uncovering these processes, insights are sought to lead to improved accuracy of valuing this particular sub-industry.

For the purpose of bringing specific discussion points and values to this paper, Salesforce.com is chosen to be the focal company of evaluation. In actuality, any young and growing company in the sub-industry would suffice, and no particular bias towards this company shall be given. This paper aims to be objective and insightful towards the accurate portrayal and valuation of this and any other SaaS company.

For this purpose, this paper shall proceed by discussing the different price-setting models, strategies, practices, and valuation methods of SaaS

firms in the literature review. Following this shall be insights found through the application of different valuation methods on the case study firm. This paper concludes by providing the overall comparison of public valuation methods found to be the most effective.

Literature Review

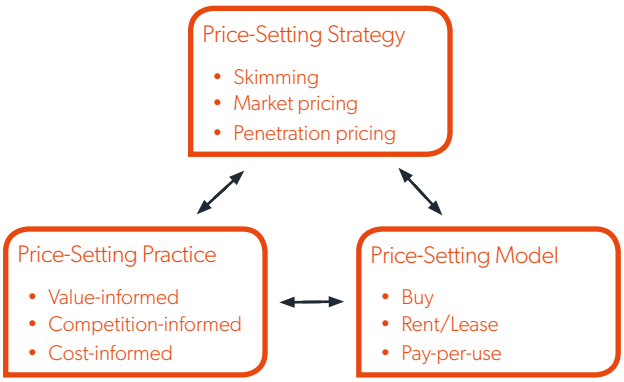
SaaS Pricing Model

This survey has selected Salesforce.com as a single case study firm because it is one of the most famous international high-tech firms using a SaaS price-setting model and it grants access to high quality financial data due to its stock exchange listing.

SaaS is the abbreviation of software as a service. Instead of investing in Salesforce.com's customer relationship management software, clients acquire a subscription-based license of a cloud-based software package. The license fee can be considered an operating rather than capital expenditure, which is a standard model for a SaaS company and a competitive advantage of this pricing model.

The first part of this literature review focuses on the theoretical framework to describe the SaaS price-setting strategy, practice, and model of the case study firm. For the purpose of this survey, the theoretical framework of Cohen and Neubert (2017) and Neubert (2017a) (see Figure 1) will be used to describe the SaaS of Salesforce.com as a pay-per-use price-setting model.

Figure 1. **Price-setting practice, strategy, and models. From "Lean internationalization: How to globalize early and fast in a small economy," by M. Neubert, 2017a, *Technology Innovation Management Review, 7*(5), 16-22. Retrieved from http://timreview.ca/article/1073**



The paper of Neubert (2017a) is based on a report showing the fundamentals of price-setting practices and how they apply to SaaS companies (Accion, 2015). Accion (2015) defines the differences between the price-setting practices of cost-informed, competition-informed, and value-informed, and then identifies the value-informed price-setting practice as the predominant strategy used by SaaS companies, with the competition-informed price-setting practices used in mainly mature markets. Salesforce.com operates as a pioneer and market leader in the customer relationship management software market using predominately value-informed pricing practices within its skimming-based price-setting strategy.

Huang (2014), who performed industry research covering the range of price-setting models offered, states that the pricing mechanisms are either usage-based, time-based, or a hybrid of the two. A pay-per-use license contract like the one of Salesforce.com can use a combination of fixed monthly licensing fees plus additional costs if the usage exceeds the defined limit (e.g. number of users) or if the client asks for product adaptations or individualizations. Time-based license contracts consist of clients making extended time period reservations, typically for one to three years. Cloud-based SaaS service providers like AWS or Salesforce.com carefully balance their pay-per-use fees depending on different factors like data storage, data retrieval, or data upload volume (Deelman, Singh, Livny, Berriman, & Good, 2008; Neubert, 2017b).

Valuation of SaaS Firms

The valuation of a corporation is influenced by many different variables, and each valuation method considers each different variable to a higher or lower extent (if at all). This is especially important for the valuation of high-tech firms with innovative business models, like Salesforce.com as an example of a young, fast-growing firm, which uses a SaaS pricing model for its cloud-based software products. Thus, this second and final part of the literature review focuses on the impact of a SaaS price-setting model on corporate valuation.

The selection of an appropriate valuation method depends on the lifecycle stage of each firm (Trichkova & Kanaryan, 2015). In every lifecycle stage, growth rates and profitability differ. The case study firm Salesforce.com can be characterized as a relatively young firm in the growth stages of its corporate lifecycle using suitable price-setting strategies, practices, and models. In this development stage, the revenue growth rate tends to be higher, and the profitability is lower (Neubert & van der Krogt, 2017).

According to Newton and Schlecht (2016), revenue and especially free cash flow growth are more than twice as important for the valuation of SaaS companies as profitability (here: EBITDA margin). Gardner (2016) confirms this finding in identifying the revenue growth rate as one of the key factors that goes into assessing a firm's revenue multiple for corporate valuation. In the time period in which this survey analyses the valuation of Salesforce.com, it is profitable but does not pay any dividends. Feld Thoughts (2015) presents a combination of revenue growth and profitability that states that a SaaS company's combined monthly recurring revenue (MRR) plus EBITDA profit margin should add up to 40% or above.

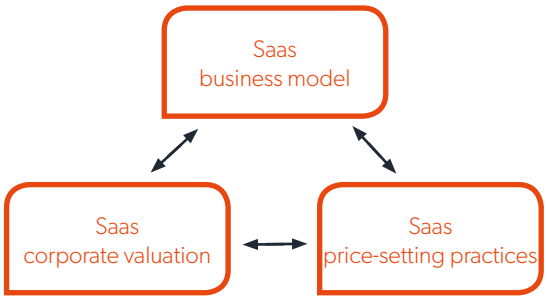
In addition to Newton and Schlecht (2016), Smale (2016) discusses the typified classification of SaaS businesses as having annual profit (seller discretionary earnings [SDE]) multiple within the range of 2.5 to 4.0 times the annual profit. This range is a function of many variables, most notably the age of the business, required time of owner involvement, growth trend of business, and customer churn rate (Smale, 2016). Tunguz (2016) provides historical data tracking the enterprise value (EV) multiple of SaaS companies over time and identifies during this time period sharp changes of the EV / forward revenue multiple void of any notable economic crises or widespread instability. Other key factors to assess the corporate valuation of SaaS firms are size of the target market, customer retention rate, gross margin, and capital efficiency (Gardner, 2016). Smale (2016) further elaborates that a large amount of intrinsic corporate value lies within intangible or qualitative measures of the firm. Examples of this include stability of the earning power, owner-specific business relationships, business traffic attributable to search engines and their algorithms, level of competition within the business niche, and type of customers targeted

> **"The emergence of companies employing the new software as a service (SaaS) business model has created a disconnect between the valuation methods used within this sub-industry and elsewhere."**

by the company. Bancel and Mittoo (2014) present survey results of 356 European valuation experts with respect to the assumptions and estimation methods for their valuation practices. The results find that even when the textbook standard models for company valuation are used, the textbooks do not fully define how to derive all input variables and key factors (Festel, Wuermseher, & Cattaneo, 2013). In addition, the company lifecycle is discussed as a means to justify the ease of transition between ownership or to create a sense of urgency (also compare to Trichkova & Kanaryan, 2015) because growth rates differ depending on the lifecycle phase.

As the literature research has shown, significant amounts of research have been conducted towards the three principle areas of this study: SaaS business models, SaaS price-setting practices, and SaaS corporate valuation. However, no prior research has been performed that investigates the intersection of these three. Therefore, this survey contributes to the impact of pricing decisions on corporate valuation of SaaS firms using the following adapted theoretical framework (see Figure 2).

Figure 2. **The intersection of SaaS business models, price-setting practices, and SaaS corporate valuation (source: the authors)**



Research Methodology

This survey used a single case study research methodology. Individual stock and market index data were collected from publicly available websites (Scholz & Tietje, 2002; Yin, 2015). The main stock in focus was then analyzed using widely accepted evaluation equations, followed by advanced analysis techniques gathered from more recent academic literature and reputable online sources, partially in comparison to selected peers. The findings from these techniques were then examined to compare valuation estimates as well as applicability towards the SaaS profit model.

The purpose of the study has led to the following research question: How do corporate valuation methods reflect the stock price value of SaaS software firms?

Corporate Valuation

Corporate valuation equations and metrics have been derived, defined, and further developed continuously since the advent of stock markets. Understanding a company's fundamental metrics and profitability has become the basis of comparison with its peer companies. Most every modern economics textbook covers the breadth of these calculations. Therefore, without providing derivations or explanation for the following calculations, the standard valuation metrics are provided below.

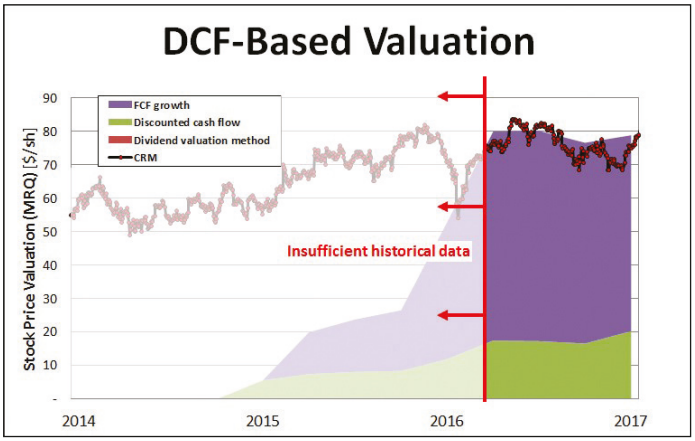
Discounted Cash Flow

The corporate valuation calculations can be separated into two main groups: the discounted cash flow (DCF) method (including variants) and relative valuation (RV) framework (Bancel & Mittoo, 2014). The first method involves calculating the net present value (NPV) for the stock's dividend, current cash flow, and forecasted cash flow growth. The summation of these three values is the resulting valuation of the company. Specific to Salesforce.com, there have been no dividends granted to date; thus, metrics related to dividends each calculate to zero.

As seen in Figure 3, the calculations match considerably well with the actual price history. Because of the year-over-year equations being used, most of the short financial history is insufficient for calculating corporate value. However, in the four quarters that are computed, the calculation accuracy is within 5%, substantially within the margin of error when taking into account non-financial sources such as news releases, macro-economic forces, and price change momentum.

The DCF method was successfully used to derive a corporate valuation for Salesforce.com of $78.91 per share using data through Q4 2017 fiscal quarter (31 January 2017). This estimation compares well to the stock price of $79.10 per share on the same day. This corresponds to a 0.24% difference (compare to Figure 3)

Figure 3. **DCF-based valuation of the case study firm**



Although the cash flow being generated by the company has created value, the bulk of the valuation comes from the free cash flow growth rate being experienced and the expectation for continued growth in future quarters, which is in line with the findings of Newton and Schlecht (2016). This important finding shows the shareholders and managers of SaaS software firms how to increase their corporate valuation. One growth driver is the use of a SaaS price-setting model. As the example of our case study firm Salesforce.com shows, every additional user or every additional activity a user performs (e.g. increase of required storage or download volume) immediately results in higher sales revenues.

The calculations of the DCF-based valuation use the CAPM model. Figure 4 shows the parameters, results, and input factors and Figure 5 additional support for these calculations.

Relative Valuation

Relative valuation does not provide a method of calculation for precisely valuing a company. Instead, it provides a range of value metrics of a company's peer group from which reasonable price estimates can be bracketed. The selected peer group consists of SAP, Adobe, Citrix, DXC, Blackbaud, Cognizant, and VM Ware (compare to Figure 6). With these estimations, it is possible to gauge if a stock is valued high, low, or on target relative to its peer/comparable companies. Caution is to be used with this method to ensure validity in company comparison, particularly taking into account the company size, sub-industry, business model, growth focus, lifecycle phase, and location.

The findings of the relative valuation suggest that traditional relative valuation methods will not work at this point in the company's lifetime with this peer group set. In fact, the relative valuation methods do not take into consideration the above-average expected free cash flow

***Figure 4*. WACC calculations within the standard CAPM model (source: the authors)**

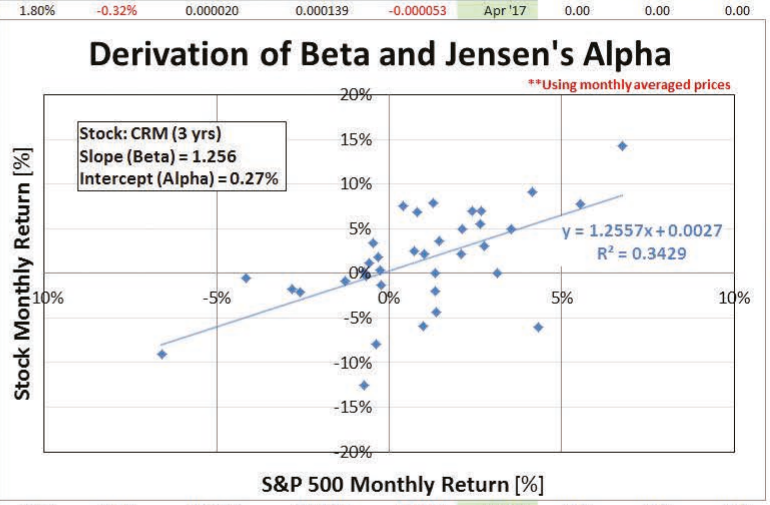
			rf	rm	β	ke		Price	P/E	Div yield
Company:	Salesforce	CRM	2.13%	8.23%	1.26	9.79%	CRM	$ 89.04	340.32	0.00%

	Int	Debt	kd	Equity	Debt	tax	WACC
CRM	89	2,826	3.15%	7,500	10,085	39.1%	5.28%
				43%	57%		

***Figure 5*. Derivation of beta and Jensen's alpha using 36-month period (source: the authors)**

Current riskfree rate =	2.360%	10 Yr	Risk premium for stocks =	4.462%		Current stock price=	$	86.55
Number of periods =	36	(3 yrs)	Riskfree rate during period =	2.135%	/yr	Current Annual DPS =	$	-
	Skip	3.00		0.1762%	/mo			

Monthly	0	CRM				Return		σ_S^2	σ_M^2	$\sigma_S * \sigma_M$		X_j^2	$(Y_j - b*X_j)^2$	$(X_j - \mu_x)^2$
Time period	Index	Price (Stock)	DPS (Stock)	Split Factor	Index Level	Stock	Index	(R(jt)-Rj)^2	(R(mt)-R(m))^2	R(j))*(R(mt)-	Date			
1	1	$ 84.19	$	1	$ 2,359.31	1.80%	-0.32%	0.000020	0.000139	-0.000053	Apr '17	0.00	0.00	0.00
2	1	$ 82.71	$	1	$ 2,366.82									
3	1	$ 80.95	$	1	$ 2,329.91									
4	1	$ 75.63	$	1	$ 2,275.12									
5	1	$ 70.11	$	1	$ 2,246.63									
6	1	$ 74.58	$	1	$ 2,164.99									
7	1	$ 73.02	$	1	$ 2,143.02									
8	1	$ 73.26	$	1	$ 2,157.69									
9	1	$ 79.55	$	1	$ 2,177.48									
10	1	$ 81.18	$	1	$ 2,148.90									
11	1	$ 81.19	$	1	$ 2,083.89									
12	1	$ 78.37	$	1	$ 2,065.55									
13	1	$ 75.78	$	1	$ 2,075.54									
14	1	$ 71.81	$	1	$ 2,021.95									
15	1	$ 62.82	$	1	$ 1,904.42									
16	1	$ 71.82	$	1	$ 1,918.60									
17	1	$ 78.94	$	1	$ 2,054.08									
18	1	$ 78.86	$	1	$ 2,080.62									
19	1	$ 76.55	$	1	$ 2,024.81									
20	1	$ 70.15	$	1	$ 1,944.40									
21	1	$ 70.48	$	1	$ 2,039.87									
22	1	$ 71.99	$	1	$ 2,094.14									
23	1	$ 72.96	$	1	$ 2,099.28									
24	1	$ 72.69	$	1	$ 2,111.94									
25	1	$ 68.00	$	1	$ 2,094.86									
26	1	$ 66.32	$	1	$ 2,079.99	7.55%	0.40%	0.003839	0.000021	-0.000284	Mar '15	0.00	0.00	0.00
27	1	$ 61.66	$	1	$ 2,082.20	6.95%	2.66%	0.003137	0.000325	0.001010	Feb '15	0.00	0.00	0.00
28	1	$ 57.65	$	1	$ 2,028.18	-0.86%	-1.27%	0.000490	0.000454	0.000472	Jan '15	0.00	0.00	0.00
29	1	$ 58.15	$	1	$ 2,054.27	-5.92%	0.99%	0.005295	0.000002	-0.000092	Dec '14	0.00	0.01	0.00
30	1	$ 61.82	$	1	$ 2,044.57	7.74%	5.54%	0.004074	0.002189	0.002986	Nov '14	0.00	0.00	0.00
31	1	$ 57.38	$	1	$ 1,937.27	-1.76%	-2.81%	0.000970	0.001345	0.001142	Oct '14	0.00	0.00	0.00
32	1	$ 58.41	$	1	$ 1,993.23	4.97%	2.13%	0.001310	0.000161	0.000458	Sep '14	0.00	0.00	0.00
33	1	$ 55.64	$	1	$ 1,961.53	1.20%	-0.59%	0.000002	0.000209	0.000023	Aug '14	0.00	0.00	0.00
34	1	$ 54.98	$	1	$ 1,973.10	0.04%	1.34%	0.000171	0.000023	-0.000062	Jul '14	0.00	0.00	0.00
35	1	$ 54.96	$	1	$ 1,947.09	4.98%	3.55%	0.001315	0.000724	0.000975	Jun '14	0.00	0.00	0.00
36	1	$ 52.35	$	1	$ 1,889.77	-4.38%	1.37%	0.003282	0.000026	-0.000291	May '14	0.00	0.00	0.00
Average		$ 40.08	$ -			1.35%	0.86%	0.003016	0.000656	0.000823	Date	0.0007	0.0020	0.0007
Sum	36					Yj	Xj					0.03	0.07	0.02



Regression Statistics and Risk Parameters

Risk and Performance Measures		St. Error
Intercept (Alpha) =	0.27%	4.77%
Slope (Beta) =	1.256	29.44%
Rf * (1 - Beta) =	-0.05%	Jensen's Alpha
Int - Rf * (1 - Beta) =	0.32%	3.90%

Variance Statistics	
Variance of the stock =	0.007642
Variance of the market =	0.001575
Systematic variance =	0.002483
Unsystematic variance =	0.005159
R squared =	40.20%

For Plot: ta) = 1.256Intercept (Alpha) = 0.27%

Using Beta	CRM	Index
Riskfree rate	2.36%	2.36%
Risk premium	4.46%	4.46%
Beta	1.256	1.000
Expected return =	7.96%	6.82%

In forecasting prices:		
Current price =	$ 86.55	$ 2,388.13
Annualized DPS =	$ -	$ 46.88

Yrs	Predicted prices:		
1	- One year from now	$ 93.44	$ 2,504.17
2	- Two years from now	$ 100.88	$ 2,625.85
3	- Three years from now	$ 108.92	$ 2,753.45
4	- Four years from now	$ 117.59	$ 2,887.24
5	- Five years from now	$ 126.95	$ 3,027.53

Your inputs

Weekly or monthly returns?	M	(M or W)
Current Riskfree Rate	2.36%	! Use today's ten -year government bond rate (make sure t
Risk Premium	4.46%	! You can use either the historical premium or the implied pr
Beta	1.256	! Enter your raw beta
Std Error of Beta	0.294	! Enter the standard error of beta
Intercept	0.274%	! Enter the intercept. If you are using a Bloomberg beta pag
Past Riskfree rate (Annualized)	2.13%	! See attached worksheet for T.Bill rates by year (This is a

This is what your output shoud look like

Rf (1 - Beta)	-0.05%	
Jensen's Alpha (by period)	0.320%	(Monthly or Weekly)
Jensen's Alpha (Annualized)	3.90%	(Annual)
67% range	0.96	1.55
95% range	0.67	1.84
Expected Return	7.96%	

Figure 6. **Relative valuation comparison between CRM and seven comparable peer-group companies (source: Morningstar 2017)**

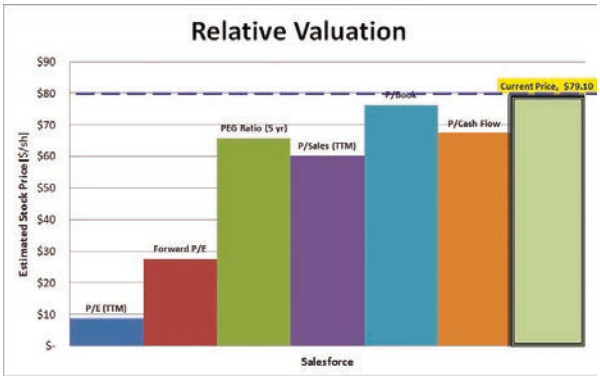
		MorningStar comparison between CRM and peer companies							
		Salesforce	SAP SE	Adobe Sys	Blackbaud	Cognizant	Citrix	DXC	VM Ware
Shareholder Equity	-	CRM	SAP	ADBE	BLKB	CTSH	CTXS	DXC	VMW
Shares Outstanding	M	711	1,199	495	48	589	151	283	407
Market Cap	$B	63.9	126.0	67.5	3.9	38.5	12.5	22.1	37.6
Enterprise Value	$B	-	-	-	-	-	-	-	-
Institutional Ownership	%	84.39%	3.71%	89.20%	0.00%	89.14%	0.00%	0.00%	39.09%
# Floating Shares	M	587	-	494	32	585	156	141	35
Short Int as % of Float	%	2.55%	0.00%	0.98%	20.05%	3.50%	4.19%	4.39%	67.90%
Beta	-	1.64	1.25	1.03	1.01	0.95	1.38	1.38	0.73
Financial Strength									
Total Current Ratio	-	0.83	1.20	1.95	0.68	3.03	1.28	1.15	2.27
Quick Ratio	-	0.75	1.14	1.86	0.22	2.83	1.16	1.03	2.19
D/A	-	0.11	0.11	0.14	-	-	0.27	0.35	-
D/E	-	0.27	-	0.25	1.42	0.08	0.78	1.16	0.19
LT D/E	-	-	-	-	-	-	-	-	-
Debt Ratio	-	-	-	-	-	-	-	-	-
Int Coverage	-	1.29	0.17	0.24	0.06	1.22	0.15	-0.00	0.58
Valuation (MRQ)									
Date	-	14 May '17	19 May '17	19 May '17	19 May '17	19 May '17	19 May '17	19 May '17	19 May '17
Stock Price	$/sh	$ 89.04	$ 105.08	$ 136.43	$ 80.34	$ 65.42	$ 82.79	$ 78.07	$ 92.52
P/E (TTM)	-	342.50	31.60	52.10	81.20	23.80	24.50	-	33.30
Forward P/E	-	58.10	19.60	27.40	34.30	15.40	16.20	9.50	18.00
PEG Ratio (5 yr)	-	2.30	2.50	1.30	2.50	1.40	1.70	0.40	1.90
P/Sales (TTM)	-	7.40	5.00	11.20	5.10	2.90	3.80	1.50	5.50
P/Book	-	8.40	4.20	8.90	15.60	3.90	7.20	11.60	4.60
P/Tangible Book	-	-	-	-	-	-	-	-	-
P/Cash Flow	-	28.80	22.60	28.20	23.90	21.80	12.70	12.90	16.50
Enterprise Value/Revenue	-	-	-	-	-	-	-	-	-
Enterprise Value/EBITDA	-	-	-	-	-	-	-	-	-
Book Value/Share	$/sh	-	-	-	-	-	-	-	-
Profitability (TTM)									
Gross Margin	%	73.38%	70.03%	86.04%	53.73%	39.36%	83.57%	25.70%	85.15%
Operating Margin	%	0.77%	22.08%	26.90%	8.29%	16.67%	19.77%	1.50%	20.29%
EBITDA Margin	%	-	-	-	-	-	-	-	-
Pre-Tax Margin	%	0.30%	21.17%	26.06%	6.92%	17.48%	18.99%	-2.31%	20.77%
Effective Tax Rate	%	-	24.94%	18.12%	9.29%	30.99%	17.97%	-	19.48%
Net Profit Margin	%	2.14%	15.89%	21.34%	6.28%	12.07%	14.03%	-1.44%	16.72%
Earnings per Share, EPS	$/sh	0.26	2.99	2.62	0.99	2.75	3.04	-0.78	2.78
Mgmt Effectiveness (TTM)									
Return on Asset, ROA	%	1.18%	7.94%	10.53%	4.29%	12.66%	8.83%	-1.33%	7.32%
Fin Leverage	-	2.34	1.78	1.72	4.48	1.37	3.09	4.36	2.06
Return on Equity, ROE	%	2.87%	14.49%	17.90%	20.29%	17.03%	25.27%	-5.24%	14.81%
Return on Inv Cap, ROCE	%	2.91%	14.46%	14.39%	9.05%	14.69%	15.04%	-1.24%	12.04%
Growth Rate (TTM)									
Earnings per Share, EPS	%	100.00%	-10.42%	60.00%	118.18%	27.78%	-68.52%	-30.00%	17.05%
Sales	%	26.78%	11.80%	21.56%	8.49%	10.74%	-19.74%	9.54%	8.83%
Dividend (MRQ)	%	-	-	-	-	-	-	-	-
Dividend (TTM)									
Dividend Yield	%	-	1.30%	-	0.60%	0.20%	-	0.70%	-
Payout Ratio	%	-	39.30%	-	48.50%	-	-	-	-
Annual Dividend	$/sh	-	1.18	-	0.48	-	-	0.56	-
Operating Ratios (TTM)									
Asset Turnover	%	55%	50%	49%	68%	105%	63%	92%	44%
Fixed Assets Turnover	%	479%	943%	761%	1,465%	1,074%	1,076%	774%	652%
Inventory Turnover	%	-	-	-	-	-	4,103%	-	-
Receivables Turnover	%	295%	372%	849%	882%	557%	731%	450%	407%
Unique Data		33	34	34	35	34	34	33	33

Range Coloring	Low: <80%	Low: 80%→99%	Within 1%	High: 101%→120%	High: >120%

growth rate shown in the DCF valuation. Thus, the selection of an appropriate corporate valuation method for a SaaS firm depends on the stage of a firm's development (Trichkova & Kanaryan, 2015).

As observed in Figure 7, all six of the relative valuation metrics estimate a corporate valuation below the current stock price. These six relative valuation metrics are: Price-Earning-Ratio (PER), Forward PER, Price-Earning to Growth-Ratio (PEG), Price-Sales-Ratio, Price-Book-Ration, and Price-Cash-Flow-Ratio. Thus, it can be suggested that the traditional relative valuation methods do not reflect the full price paid at a stock exchange of fast-growing high-tech firms.

Figure 7. **Relative valuation of Salesforce.com using six metrics from seven comparable companies (source: the authors)**



Conclusions

The standard valuation calculations were successfully used to derive a corporate valuation for Salesforce.com of $78.91 per share using data through Q4 2017 fiscal quarter (31 January 2017). This estimation compares well to the actual stock price of $79.10 per share on the same day. This corresponds to a 0.24% difference.

The relative valuation process did not favorably estimate the valuation of Salesforce.com through comparison with comparable peer companies. The four closest comparisons estimate a valuation of $67.42 per share, or a 17% difference with the price at the end of Q4 2017. This discrepancy is perceived to be due to the higher growth phase of Salesforce.com as compared to similar companies and thus suggests that company lifecycle is of greater importance when selecting a peer set.

The literature search highlighted several additional concerns for company valuation that cannot be quantified. Such important characteristics of a company emphasize the human component required in the valuation team, and no clear and conclusive conversion to a mathematical formulation has been derived.

The guidelines on using rule-of-thumb estimates is that they are only valid when the situation is analogous to when the rule was first derived. The changing financial climate of the increasingly interconnected and interdependent world is creating situations more complex than ever before. All observations made here are strictly limited to SaaS companies and within the short timeframe of the past 10 years. Their applicability toward the future is only as valid as the assumption that the future shall be stable and predictable. Single case studies have a number of natural limitations and concerns like that of replicability, generalizability, and reliability due to the small sample size. Thus, any future study would benefit from the same level of intense examination and investigation for other comparable SaaS companies and for longer time periods.

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Using Tacit Knowledge Exchanges to Improve Teamwork

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Abstract

This paper suggests ways to improve the synergy between tacit knowledge exchanges and teamwork effectiveness. We begin by assessing the relationship between tacit knowledge exchanges and key building blocks which underscore how organizational learning is analyzed. Following this, the literature relevant to teamwork, organizational learning, and knowledge management is reviewed. We propose that as organizations evolve they should strive towards a strategic knowledge management approach using the learning organization as a practical model. Because teams are a crucial vehicle for organizational learning and knowledge management, we review the literature on context fundamentals for effective teamwork. The findings suggest that the context for organizational learning and effective teamwork are similar, and that these are both similar to the context for tacit knowledge in its early stages of development. Knowledge exchanges and effective teamwork are highly related and key for the generation of new knowledge. The paper concludes by suggesting practical interventions and guidelines to improve the synergistic exchanges between tacit knowledge-driven organizational learning and effective teamwork.

Keywords: tacit knowledge, teamwork, organizational learning, knowledge management

Introduction

Much of what we do in the workplace is done cooperatively with others. These ad hoc and more formal teamwork experiences provide opportunities for shared learning, often through an exchange of experience-based tacit knowledge. By definition, such knowledge is less structured than explicit knowledge, often personal and context specific (Andrews, 2017; Brown & Duguid, 1991; Nonaka, 1994; Polanyi, 1966; Spender, 1993). When tacit knowledge exchanges occur in the context of teamwork focused on resolving complex, challenging, and dynamic issues, the learning opportunities become more important both operationally and strategically (Barney, 1991; Eisenhardt & Martin, 2000; Hitt, Keats, & DeMarie, 1998). Our purpose in this paper is to suggest ways to improve the synergy between tacit knowledge exchanges and teamwork effectiveness.

Organizations, especially those reliant on sophisticated knowledge management, face an array of challenges due to dynamic complexity, technological change, and international competition (Grant, 2010). They respond by deploying multidisciplinary teams of specialists with the formal knowledge needed to sustain organizational effectiveness and competitive advantage (Alexander & van Knippenberg, 2014; Yamklin & Igel, 2012). These specialists bring to the team the explicit knowledge from their respective disciplines and their personal experience to date in its application. An important determinant of the team's success is how well they can communicate both their explicit and tacit knowledge to develop shared mental models (Wilson, Goodman, & Cronin, 2007). The working hypothesis of many knowledge management and teamwork experts is that improved shared mental models result in greater team effectiveness; and, in turn, improved team effectiveness generates more experience-driven knowledge exchanges (Edmonson, 2002; Hass & Mortenson, 2016; Jones & George, 1998; van der Vegt & Bunderson, 2005). Advances in capturing and applying tacit knowledge (Ambrosini & Bowman, 2001; Andrews, 2017; McIver, Lengnick-Hall, Lengnick-Hall, & Ramachandran, 2013) provide useful tools for the development of new teams, orienting newcomers to existing teams and improving and sustaining long-term team functioning.

The purpose of this paper is fivefold:

- To describe the important role of tacit knowledge exchanges in support of the key building blocks that underscore organizational learning;
- To explore how the literature on organizational learning, the learning organization, and knowledge management are interrelated;
- To summarize the literature describing key variables associated with effective teamwork;
- To propose links between theories of organizational learning and knowledge management, on the one hand, and theories of organizational lifecycles on the other;
- To suggest practical interventions and guidelines to improve the synergistic exchanges between tacit knowledge-driven organizational learning and effective teamwork.

Organizational Learning and Teamwork Effectiveness

Here we review selected literat¬ure as background for our recommendations to improve the synergy between tacit knowledge exchanges and teamwork effectiveness. We start by introducing the systemic challenges that have evolved over the last few decades and then focus on learning and specialized teamwork as dynamic capabilities to deal with dynamic complexity.

We start with the context described by Kimberly and Bouchikhi in 1995:

> … Organizations, both large and small in a variety of industries located around the globe are currently struggling with the basic questions of how to enhance their capacity to innovate and adapt rapidly to changing markets and technologies. (p. 9)

Eisenhardt and Martin's (2000) solution was for firms to enhance their dynamic capabilities, especially in high-velocity markets, through learning; they define these capabilities as follows: "Dynamic capabilities … in high-velocity markets … are simple, highly experiential and fragile processes with unpredictable outcomes" (p. 1105). Eisenhardt and Martin (2000) state that "well-known learning mechanisms guide the evolution of dynamic capabilities" (p.1105). A common practice to enhance such capabilities through learning was to organize diverse sets of experts into teams to deal with the challenges of the time:

> In recent years there has been a significant increase in the use of … multidisciplinary work teams…. The motivating premise underlying the use of these teams is that when representatives from all of the relevant areas of expertise are brought together, team decisions and actions are more likely to encompass the full range of perspectives and issues that might affect the success of a collective venture. Multidisciplinary teams are therefore an attractive organizing option when individuals possess different information, knowledge, and expertise that bear on a complex problem or issue. (van der Vegt & Bunderson, 2005, p. 532)

In summary, the performance and survival challenges faced by many organizations require enhanced dynamic capabilities. Teams of experts pooling their explicit discipline-based knowledge, while evolving and perfecting their shared experience-based tacit knowledge, develop the needed capabilities thereby improving and sustaining their effectiveness.

The Learning Organization and Knowledge Management

Like individuals, organizations learn naturally from their experiences (Smits & Bowden, 2015). However, that natural process, without guidance, is a hit-and-miss phenomenon that many organizations in dynamic situations can no longer afford. In Edmondson's words, learning is now a competitive imperative: "Today's central managerial challenge is to inspire and enable knowledge workers to solve, day in and day out, problems that cannot be anticipated" (2008, p. 60). She is not alone in her emphasis on the strategic importance of learning, but one of many scholars and leaders sending similar messages. Some examples include Argote and Miron-Spektor (2009), Gardner, Gino, and Staats (2012), Rowden (2001), Wilson et al. (2007), and Yamklin and Igel (2012). Here we briefly summarize and integrate three related fields of theory and inquiry: organizational learning, the learning organization, and knowledge management.

While organizational learning developed out of the fields of organizational behavior and behavioral psychology in the late 1970s (Andrews, 2018), recent scholarly attention explores the relationship of this field to the concept of the learning organization and to the field of knowledge management (Andrews, 2018; Andrews & Smits, 2018; Prusak, 2001). Although many definitions of organizational learning can be found in the scholarly literature, we prefer Argote and Miron-Spektor's (2009) definition which states that "organizational learning is a change in the organization that occurs as the organization acquires experience" (p. 4). Edmondson (2002) argues that organizational learning happens primarily thanks to interactions among individuals who form the small groups and teams within the larger organization. Teams are therefore a crucial unit of and vehicle for organizational learning. There is consensus within the scholarly literature that, whether focusing on the entire entity (e.g. a company) or subsets within the organization, the level of analysis must be collective rather than an aggregate of individual learning (Klein, Dansereau, & Hall, 1994; Wilson et al., 2007). Collective routines and behavior may thus be considered forms of organizational knowledge. Wilson et al. (2007) further contend that any notion of collective (i.e. group or organizational) learning must take into consideration processes of sharing, storage, and retrieval of knowledge, and must be observable as an outcome—for example, as a change in collective routines and behavior over time.

The learning organization concept developed primarily in the 1990s and is frequently associated with the work of Peter Senge who defines learning organizations as places "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (1990/2006, p. 8). Argyris and Schon (1996) assert that the concept is a branch of the organizational learning literature developed mainly by consultants and practitioners rather than scholars. In our view, the concept is best conceived as an ideal type towards which organizations may aspire by adopting best practices in organizational learning designed to yield desired outcomes. This view is supported by scholars such as Garvin, Edmondson, and Gino (2008), Heorhiadi, La Venture, and Conbere (2014), Jagasia, Baul, and Mallik (2015), King (2001), Kirwan (2013), Lazar and Robu (2015), Rowden (2001), Shipton, Zhou, and Mooi (2013), and Yang, Watkins, and Marsick (2004). In this paper, we refer to the Learning Organization Survey developed by Garvin et al. (2008). This diagnostic tool designed to foster learning consists of questions for members of the organization to answer about the learning environment and practices in the given organization. The survey is organized into three "building blocks" which its authors argue are necessary conditions for organizational learning to develop: "(1) a supportive learning environment, (2) concrete learning processes and practices, (3) leadership behavior that reinforces learning" (p. 110).

The field of knowledge management, which also developed primarily in the 1990s, shares many of the same concerns as organizational learning; these concerns include knowledge acquisition as well as learning processes and outcomes. However, knowledge management places more emphasis on managing what is learned (Argote, 2005). Citing Foss and Mahnke (2003), McIver et al. (2013) state

that "[knowledge management], a set of management activities… has emerged as a particularly influential organizational competence that shapes the work environment" (p. 597). The knowledge management literature includes the richest discussion of different types of knowledge, such as tacit versus explicit (Spender, 1993), different epistemologies of knowledge (Cook & Brown, 1999), and modes of knowledge creation (Nonaka, 1994).

We propose a synergistic relationship among the three fields both in terms of research and practice. We concur with Argote (2005) when she states that "if we had a deeper understanding of the processes through which organizations learn, we could design better knowledge management systems to capture and transfer knowledge acquired through that learning" (p. 46). Moreover, our view is that links can be made between the different phases in the lifecycles of organizations and/or teams and the different fields discussed above. Elements of organizational learning will transpire automatically when people work together on common projects, but, as the group or organization matures, it must adopt a knowledge management approach which implies a more conscious and strategic perspective on the inventories of knowledge already existing, on the processes in place to acquire and generate new knowledge, and on the processes of knowledge transfer and dissemination. The learning organization can function as a springboard towards a knowledge management approach. It can do this by providing tools to assess current organizational learning according to the three "building blocks" proposed by Garvin et al. (2008) with a view to leveraging strengths and managing weaknesses to reach desired outcomes.

In summary, organizational learning is now a competitive imperative to be nurtured by the learning organization model which can help organizations achieve a strategic knowledge management approach. Learning organizations provide a context for learning (Building Block 1 as per Garvin et al., 2008), similar to what research has shown to be a condition for effective teamwork. We now review the literature on teamwork to establish the synergistic relationship between experience-based tacit learning in teams and effectiveness.

Teams and Teamwork

Ancona, Kochan, Scully, van Maanen, and Westney (1996) describe the key features of a team as "members working interdependently and being jointly accountable for performance goals" (p. 5). Citing the work of Sundstrom and McIntyre (1991), they attribute team success to a four-factor team effectiveness model that includes team learning, defined as "how well team members acquire new skills, perspectives, and behaviors as needed by changing circumstances" (p. 9). Similarly, Nelson and Quick (2000) note that teams, as distinct from groups, "emphasize shared leadership, mutual accountability, and collective work products" (p. 138). The authors offer rationales for the use of teams when work is "complicated, complex, interrelated" (p. 144). Nelson and Quick (2000) state that "teams are appropriate where knowledge, talent, skills, and abilities are dispersed among organizational members and require integrated effort for work accomplishment" (p. 144). So, in the descriptions of and rationales for teamwork, we see connections among several variables: complexity, change/adaptation, integration of knowledge, skills and abilities, and interdependent functioning.

As work became more complex and as organizations experienced more dynamic complexity, the homogeneous, supervisor-led teams of the 1970s and 1980s morphed into self-managed work teams (Garson & Stanwyck, 1997) and multidisciplinary teams (van der Vegt & Bunderson, 2005) in the 1990s. Fast forward 20 years, and we have Hass and Mortensen (2016) telling us that the teams in today's business world barely resemble those of the past. According to these authors,

today's teams are "far more diverse, dispersed, digital, and dynamic (with frequent changes in membership)" (p. 71). Nevertheless, Hass and Mortensen (2016) argue that the success of today's teams "still hinges on a core set of fundamentals" (p. 71) which include context fundamentals, process fundamentals, and learning fundamentals. Each of these is discussed briefly below.

Context fundamentals.

Executive buy-in, direction, and support. Hass and Mortensen (2016) argue that "the foundation of every team is direction that energizes, orients, and engages its members" (p. 72). In knowledge-based organizations, executives must cultivate and buy into an "execution-as-learning" rather than an "execution-as-efficiency" approach (Edmondson, 2008). In such organizations, "performance is increasingly determined by factors that can't be overseen: intelligent experimentation, ingenuity, interpersonal skills, resilience in the face of adversity" (Edmondson, 2008, p. 62). Executives can get behind this approach by designing reward systems accordingly and by providing appropriate material resources, information support systems, and proper training and education (Haas & Mortensen, 2016). Executives who cannot actively support this approach will, at best, not have any impact on the teams they manage, or, at worst, negatively impact them.

Psychological safety and high levels of trust. Edmondson's (1999) seminal study of psychological safety and team learning establishes its centrality for team effectiveness. Reviewing her work, Cunha and Louro (2000) observe that the concept is about more than members trusting each other—it includes "an underlying shared belief in the value of the team and a climate of mutual support" (p. 153). Later, Edmondson describes psychological safety as "a sense of confidence that the team will not embarrass, reject, or punish someone for speaking up. This stems from mutual respect and trust among team members" (2002, p. 354). In a similar vein, Jones and George (1998) propose that, when unconditional trust was present in relationships among team members, a more synergistic and cooperative team dynamic was likely to develop and that the intense interaction of these teams would likely generate and actualize tacit knowledge.

Identification with the team, its mission, and processes. Team functioning is influenced by the degree to which its members identify with each other and the mission. This can be an issue for multidisciplinary teams where its members belong to multiple teams—for example, when members are also assigned as experts to (other) discipline-based teams and project or functional teams (O'Leary, Mortensen, & Woolley, 2011). van der Vegt and Bunderson (2005) find that, "in teams with low collective identification, expertise diversity was negatively related to team learning and performance; where team identification was high, those relationships were positive" (p. 532).

Process fundamentals.

Cross-understanding and shared mental models. According to Huber & Lewis (2010), teams that engage in tasks that require the use of diverse knowledge and which work interdependently for task accomplishment need to understand each other's mental processes in order to be successful. Their work describes the processes used to achieve cross-understanding among multidisciplinary experts which evolves to shared mental models defined as "a person's mental representation of a system and how it works" (p. 7). Haas and Mortensen (2016) suggest that team leaders can help achieve such a shared mindset by cultivating a common team identity and understanding; they furthermore contend this team identity is a necessary ingredient for success for today's geographically dispersed and diverse teams which rely on digital communication.

Implicit coordination. With the dynamic complexity underscoring the need for diverse teams comes the challenge of quickly aligning team responses to unexpected change. Rico, Sanchez-Manzanares, Gil, and Gibson (2008) argue for teams to engage in implicit coordination which transpires when "team members anticipate the actions and needs of their colleagues and task demands and dynamically adjust their own behavior accordingly without having to communicate directly with each other or plan the activity" (p. 164). Rico et al. (2008) further posit the existence of an "underlying mechanism" which allows for such coordination. They refer to this mechanism as "team-level knowledge structures-team situation models (TSMs)," defined as "dynamic, context-driven mental models concerning key areas of the team's work" (Rico et al., 2008, p. 164). The authors assert that TSMs are both "shared and accurate" (p. 164).

> **"Teams working in learning organization environments are likely to be more effective than those working in less innovative settings and/or in settings which fail to proactively assess and leverage learning."**

Learning fundamentals.

Teamwork development: Relationship, knowledge, and skill building. Teams do not suddenly emerge as accomplished entities; rather, they go through lengthy periods of development. Tuckman (1965) describes the typical team's stages of development as forming, storming, norming, and performing. Later teamwork development scholars use other terms but continue to maintain that teams go through stages of development. It takes time, effort, and sometimes helpful guidance to develop trust, understand each other's mental models, and learn to anticipate needed adjustments to make the team's operations as smooth as possible. Tacit knowledge exchanges play an important role here.

Continuous improvement through learning. Teams never stop learning; they refine their practices through shared experience, adjust to changes in mission, membership, resources, and technology (Wilson et al., 2007). Much of the change that occurs in teams through learning is an iterative process with day-to-day adjustments accumulating over time to produce noticeable changes, some of which may be institutionalized as best practices (Crossan, Lane, & White, 1999; Raelin, 1997; Smits, Bowden, Falconer, & Strasser, 2014).

To conclude this section, we see the variables associated with effective teamwork as consistent with Building Block 1 of the Learning Organization Survey (Garvin et al., 2008). In our view, organizational learning and effective "execution-as-learning" teamwork support and stimulate each other.

Findings from the Literature Review

The findings from the literature review suggest that effective teamwork is a dynamic capability of an organization and also that teams function to a certain extent like microcosms of larger organizations. Parallels can be drawn between the building blocks required for learning organizations to develop and the context fundamentals required for high performing teams to develop. Tacit knowledge exchanges are a crucial component of team learning and new knowledge generation, which are both necessary for organizations to differentiate themselves from competitors. Moreover, we conclude there are parallels between organizational lifecycles and approaches to organizational learning.

As an organization matures, it needs to move from a hit-and-miss approach to a more conscious leveraging of learning and management of knowledge. In the next section, we attempt to provide useful guidelines showing how improved knowledge management practices specific to capturing and applying tacit knowledge can help teams form, mature, and function more efficiently and effectively

Synergistic Exchanges: Tacit Knowledge and Teamwork

Above, we referred to Tuckman's (1965) forming, storming, norming, and performing stages, and we stated that there was broad agreement in the scholarly literature that teams pass through such phases in their development. Later authors tend to replace Tuckman's terms with other similar descriptive terminology such as Nelson and Quick (2000) who refer to mutual acceptance, decision making, motivation and commitment, and control and sanctions. According to these authors, it is in the final stage, control and sanctions, that a group has become "a mature, effective, efficient, and productive unit" (Nelson & Quick, 2000, p. 287). We have chosen to structure our discussion of the relationship between tacit knowledge and teamwork around three periods in the lifecycle of teams: startup, maturation, and maturity. We propose that variations of exercises based on Andrews's (2018) applications of Ambrosini and Bowman's (2001) causal mapping method and based on Mclver et al.'s (2013) knowledge-in-practice framework can accelerate the learning processes and outcomes at each of the three phases in the team's development cycle.

Team Startup – Major Task: The Development of Trust

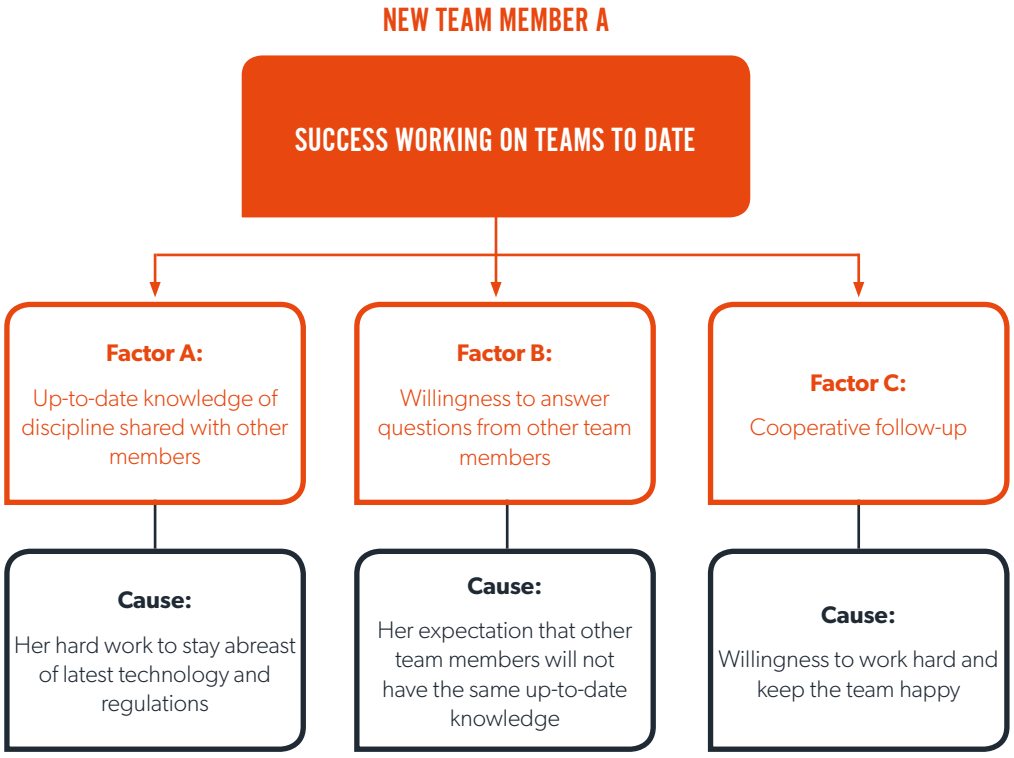
Given the importance of psychological safety to organizational learning (Garvin et al., 2008) and team functioning (Edmondson, 1999), the make-or-break issue early in the development of teamwork effectiveness is the development of trust. Teams that rush the interpersonal development among team members and fast-forward to task issues often experience Tuckman's (1965) storming phase. As Ancona and associates (1996) observe that, to evolve into trusting and supportive units, team members need to experience empathy, equality, and spontaneity. Developing that type of relationship requires shared interpersonal experiences that include exchanges of tacit knowledge (Jones & George, 1998). Facilitators who work with startup teams to help them master the mutual acceptance stage have traditionally used interpersonal exercises such as "Getting Acquainted Triads" and "Johari Window: An Exercise in Self-Disclosure" (Pfeiffer & Jones, 1972). Here we suggest two exercises for getting acquainted that help communicate team members' work experiences and knowledge-in-practice to help members understand each other's mental models.

In the first exercise, new team members are asked to develop and present a "causal map," pinpointing three key factors they perceive as determinants of the success they have had on teams to date and describing the sub-factors and/or enabling conditions (causes) for these three main factors. To illustrate, we present two very different hypothetical team members. New Team Member A represents an objective, explicit knowledge-oriented team member while New Team Member B is more relationship-oriented.

The first factor New Team Member A identifies as a determinant of her success on past teams is up-to-date knowledge of her discipline (accounting), which she shares with her team members. She describes the sub-factor (cause) which enables this as hard work on her part to stay abreast of the latest technology and regulations. The second factor she cites as a determinant of success is a willingness to answer all questions from other members about her inputs. She describes the enabling sub-factor as her expectation that others will not have the same up-to-date knowledge; therefore, she feels a sense of responsibility to inform them. The third factor she cites as a determinant of success is the cooperative follow-up she provides even when she does not think it is necessary. The enabling condition is her willingness to work hard to keep her team happy. As per the causal mapping method, New Team Member A then tells a few stories about past episodes when she worked hard to please her team.

Meanwhile, the first factor New Team Member B cites as a determinant of his success on past teams is his affinity for working with others to solve problems and make progress. He describes the underlying

Figure 1. **Causal mapping of New Team Member A's success on teams to date**



sub-factor (cause) as the fact that he likes other people, finds them fascinating, and has studied non-verbal communication. The second factor for his success on teams is his ability to listen carefully to others to understand both the content and emotions behind what they are saying. He describes the enabling sub-factor as his belief in the importance of communication – he likes to "hear people out" and "get everything on the table." The third factor New Team Member B identifies as a determinant of his success on teams is that he is a helper and that he is willing to do whatever the team needs him to do. He describes the enabling sub-factor as his affinity for working with people from other areas of expertise. New Team Member B then relates several stories about his cross-functional activities while participating on past teams in his role as a strategic planner.

So, we have two very different new team members, both valuable assets with much to contribute but who will contribute different content using quite different participation styles. New Team Member A will contribute to task accomplishment by helping the team with its "information seeking" and "summarizing" functions while New Team Member B will be a valuable resource for the team's processing functions by helping with its "harmonizing" and "encouraging" functions (Ancona et al., 1996).

In the second exercise, new team members answer questions from McIver et al.'s (2013) knowledge-in-practice framework from their disciplinary perspective and team experience in order to communicate the relationship of knowledge (explicit and tacit) to performance:

- What is high performance?
- How is high performance attained?
- What needs to be known?
- How does knowing take place?
- How is knowing applied?
- Can you describe specific examples based on work experience of high performance?

This exercise is designed to generate knowledge-in-practice profiles which can serve multiple purposes: orientation of members to each other when new teams are formed, an inventory of team knowledge assets, and a resource to orient new members to the team as members are added for growth or replacement purposes.

Team Maturation – Major Task: Learning from Shared Team Experiences

Our team is now fully functional, having moved to the next stage of its development. Its task accomplishment and team process functions are adequately developed, and it is engaged in productive activity. This is an exciting period in a team's history; it continues to get better as it improves its methods, sharpens its skills, and innovates through experimentation. It is positioned to implement Nonaka's (1994) SECI Model that generates and captures tacit knowledge, combines it with existing explicit knowledge, and produces new forms of knowledge. It is also in a position to begin developing a useful team culture that helps members function more efficiently [internal integration] and deal more effectively with external stakeholders and environmental factors [external adaptation] (Smits, Bleicken, & Icenogle, 1994).

Team members, working interdependently, collectively experience successes and failures, which are both valuable sources of learning. Multiple forms of "after-action" feedback help teams engage in action learning (Argyris et al., 1985; Rowden, 2001) or what Edmondson (2008) calls "execution as learning." Here we suggest a relatively new form of feedback: causal mapping of successes and failures. With fully functioning teams that are still refining their activities and honing their knowledge and skills, the after-action analysis becomes a team

activity. Similar to what we suggest above in the team's first phase of development and to help bring new members on board, we suggest the teams use Andrews and Smits's (2018) integration of the Ambrosini and Bowman (2001) causal mapping method and key questions from McIver et al.'s (2013) knowledge-in-practice framework. Going through this exercise is a learning experience in itself as well as a robust methodology to uncover a team's strengths, working knowledge, and improvement challenges.

Team Maturity – Major Task: Coping with Change and Dynamic Complexity

Teams with substantial shared experience develop a culture that helps them deal effectively with internal integration and external adaptation. As Schein (2010) notes:

> The most useful way to think about culture is to view it as the accumulated shared learning of a given group covering behavioral, emotional, and cognitive elements of the group members' total psychological functioning. For shared learning to occur, there must be a history of shared experience. (p. 10)

Mature teams have established routines embedded in team cultures that improve efficiency but often hinder or slow needed responses to change (Schein, 2010; Smits & Bowden, 2015). Such stability can be upended by changes in membership, something Haas and Mortensen (2016) say is quite common with today's teams. Here we discuss the challenges faced by new members as they enter mature teams with strong operating cultures and the challenges faced by mature teams in terms of coping with dynamic complexity.

New members enter mature teams prepared to share their explicit knowledge and with expectations shaped by their previous team experiences. But each team is different, composed of unique individuals and informed by the team members' shared experiences to date. The success or failure of the new member is largely determined by how readily she/he adjusts to the new team environment and the degree to which she/he identifies with its mission, members, and modus operandi (Huber & Lewis, 2010; van der Vegt & Bunderson, 2005). Regarding modus operandi, Schein (2010) observes: "We all know that one of the major activities of any new member … is to decipher the norms and assumptions that are operating" (p. 13).

Nelson and Quick (2000) describe the behavioral norms in mature groups as "well understood standards of behavior within a group … benchmarks against which team members are evaluated and judged by other team members" (p. 288). Such expected behaviors are often extremely subtle, tacit in nature, and even rooted in unique language and non-verbal cues developed by the mature team over time. Here we suggest two resources for new members entering a mature team. Firstly, if the team has maintained the knowledge-in-practice profiles developed by members when the group was formed as we suggest above, such profiles, perhaps updated over time, could be useful to introduce new members to existing members. Secondly, if the mature team engages in ongoing "after-action" causal modeling analyses, recent ones will help newcomers better understand what the team does to produce successful outcomes, an excellent clue for learning behavioral norms.

Related to the subtleties of behavioral norms and also deeply rooted in tacit knowledge are the implicit coordination mechanisms described by Rico and associates (2008). It is no secret that mature groups lose some of their spontaneity, react slower and with less innovation to new complex situations, often stemming from dynamic complexity. As implicit coordination declines in effectiveness, the mature team's ability to deal effectively with change also declines (Trautlein, 2013). Mature teams would be wise to use implicit coordination failures as learning experiences to revisit how they cope by "causal mapping" recent incidents with special attention to causal factors and needed knowledge.

In summary, teams never outgrow their need to learn (Smits et al., 2014). The learning tasks change as teams form and mature, but learning remains essential to continued success. At all stages of team learning, experience-driven tacit knowledge has a key role to play, and the exercises we suggest can help surface and disseminate this knowledge in a useful way, thus rendering more efficient and effective the team learning cycle.

Using Teamwork to Generate Useful Tacit Knowledge

Teams of experts challenged by complex problems in contexts experiencing dynamic complexity are the perfect incubators of tacit knowledge. As Nonaka (1991, 1994) discusses, socialization is the first step in his SECI model of knowledge creation. During socialization, tacit-to-tacit knowledge is exchanged during discussions and through shared experiences. It is also the first step in the process of team formation. When team members achieve high levels of trust, it shows in their verbal and non-verbal exchanges; such teams exchange tacit knowledge naturally (Jones & George, 1998). And, of course, the learning organization's (Garvin et al., 2008) first essential building block posits many of the context variables associated with effective teamwork, implying that effective teams are core elements in learning organizations.

Why is it important to have effective teams generating tacit information? Simply because generating such information is the origin of innovation that provides organizational uniqueness – difficult to imitate and essential to achieving and maintaining competitive advantage (Andrews & Smits, 2018; Crossan et al., 1999; Lawrence, Mauws, Dyck, & Kleysen, 2005; McIver et al., 2013). Without effective teams generating tacit information for future organizational learning, organizations struggle to distinguish themselves in a positive manner from their competitors.

Concluding Statement

In the early stages of development of an organization, aspects of collective learning will transpire more or less automatically as people work together. However, as organizations mature, they should aspire towards a learning organization model, making use of assessment tools and best practices to achieve a more deliberate and strategic knowledge management approach. Teams are a crucial vehicle for this evolution, and today's cross-functional, diverse, geographically dispersed, technology-connected teams require an "execution-as-learning" management approach appropriate for knowledge-based-organizations. It is our working hypothesis based on theory, research, and observations of teams in a variety of settings that effective teams will produce useful tacit knowledge unique to the enterprise. Moreover, teams working in learning organization environments are likely to be more effective than those working in less innovative settings and/or in settings which fail to proactively assess and leverage learning (i.e. to adopt a strategic knowledge management approach). Further, we contend that the synergistic relationship between knowledge management practices that capture and apply tacit knowledge and effective teamwork is enhanced by a better understanding of each. Exercises developed from knowledge management literature can be adapted and applied to team settings throughout the team's lifecycle to build trust and implicit coordination among the team members and to help analyze the team's past failures. Ultimately, this will accelerate the team's learning cycle which will impact the entire organization.

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Digital Transformation and Leadership Style: A Multiple Case Study

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** based on a dissertation supervised by Nicholas Harkiolakis*

Abstract

This research addresses the inability of executives and managers to successfully meet the challenges associated with the execution of digital transformations (DT) in their organisations. We used a qualitative multiple case study to identify the optimal leadership styles, characteristics, and traits that could enable the successful implementation of DT programmes in organisations headquartered in France. The unit of analysis is individuals in organisations responsible for planning and implementing DT initiatives. Eight individuals were recruited for participation from medium and large enterprises in the hospitality, healthcare, pharmaceutical, and banking sectors in France. Data were collected from semi-structured interviews using a protocol that was developed for the purpose of this study. The results of the study indicate that, although digital technology for transformation is disruptive, operational performance leaders are prepared to adapt their styles, characteristics, and traits to suit this new digital era and to change their ways of working once given a clear vision, commitment, and support from executives. Leaders can positively influence, train, move, and fail through experimentation while contributing to improved ways of working at all levels by adopting co-creation and co-designing cross-functional methodologies that are agile and inclusive. Future research could explore the phenomenon of DT within organisations of varying sizes in wider geographic regions and industries.

Keywords: digital transformation, leadership, follower, executives, styles, characteristics, traits

Introduction

The future of leadership styles in implementing digitalisation and transforming operations remains an important area of investigation, especially in establishing leadership practices that govern the complexities of organisational digital transformation (DT) (Davenport & Westerman, 2018; Kane, Palmer, Phillips, Kiron, & Buckley, 2018; Weill & Woerner, 2017). The term digitalisation is defined as the mass adoption of connected digital technologies as services by consumers, enterprises, and governments (OECD, 2017a, 2017b; World Economic Forum, 2016). Empirical work undertaken at the industry level has determined the relationships between digitalisation, productivity growth, the way work is performed, an evolution in leadership style, reshaping and/or replacing business models, increased collaborations, and increases in revenues for organisations (Hesse, 2018; Libert, 2016; OECD, 2017a; World Economic Forum, 2015).

Research shows that DT will influence four dimensions of an organisation: use of technology, change in value creation, structural change, and financial aspects, plus new business models and the creation of new market spaces (Matt, Hess, & Benlian, 2015). However, success in DT occurs through leadership in light of the transformation's components, crosses, and organisational boundaries (Danoesastro, Freeland, & Reichert, 2013). Westerman, Tannou, Bonnet, Ferraris, and McAfee (2017) supported that leadership needs to align DT with the leaders' vision and continuous two-way communication. Once organisations have had time to adjust, Bharadwaj, El Sawy, Pavlou, and Venkatraman (2013) posited that they need to rethink the role of digital technology within the broader strategic initiatives that involve integrating information technology (IT) strategies with business strategies, referring to this as DT. Researchers and practitioners have thus acquired a better understanding of the concept of DT, exploring the phenomenon that DT leadership is now considered a prime topic for firms across the globe, which influences new research interests and affects multiple business disciplines, especially those concerning leadership (Bharadwaj et al., 2013; Ismail, Khater, & Zaki, 2017).

Leadership Problems Relating to Complex Transformation

The leadership problem is that executives and managers cannot successfully address challenges associated with the execution of DT in their organisations (Hesse, 2018; Parviainen, Tihinen, Kääriäinen, & Teppola, 2017; Schneider, 2018; Singh & Hess, 2017). Some studies indicate leadership is the issue in failing DT initiatives while other studies blame issues with established management practices, governance, culture, and executing complex transformation programmes across organisations (Wokurka, Banschbach, Houlder, & Jolly, 2017).

Researchers have indicated there are issues in leadership skills and the acquisition of new competencies that align with DT practices and support growth opportunities (El Sawy, Kraemmergaard, Amsinck, & Vinther, 2016; Hesse, 2018). Other researchers make note that a greater understanding is needed to determine who is best suited to lead DT (Horlacher & Hess, 2016). Questions also remain about leadership effectiveness and how to articulate the value of digital technology (Kluz & Firlej, 2016). Besides, studies of successful firms indicate that DT does not depend on technology adoption but on the leadership mindset and its strategies (Bonch, 2016). The gap identified exists between executives' leadership intentions and the realisation of successful DT initiatives (Ismail et al., 2017; von Leipzig et al., 2017).

Optimal Leadership Exploration and Identification

We explored and identified those optimal leadership styles, characteristics, and traits that would enable the successful implementation of DT programmes in organisations and determined those that achieve a high level of effective leadership, aligning teams on how to deal with digital transformational change. The study uses the Harkiolakis (2017) leadership conceptual framework to explain the appearance, evolution, and practice. It further explores the internal features of the organisation in which groups operate in the broader environment (stakeholders that influence the organisation). The framework takes a modern approach at providing a comprehensive understanding of the appearance and evolution of leadership as fluid and dynamic, including conscious and subconscious thoughts, feelings, and emotions (Gronn, 2000; Harkiolakis, 2017).

Literature Review

The Business Backdrop

Researchers do not have a unified view of the concepts of DT practice (Morakanyane Grace, & O'Reilly, 2017). Practitioners view the exploration of the process of digitalisation and its implications in organisations as "digital transformation," and consider it a global megatrend with the ability to fundamentally change existing and future industries and operations (Benzerga, Hauf, Pretz, & Bounfour, 2018). There is universal adoption of the term DT by institutions (Kluz & Firlej, 2016; OECD, 2017a).

Hernandez, Faith, Prieto Martín, and Ramalingam (2016) explored the factors that DT provides to the broader economy and broader societal developments. Hesse (2018) argued that although broader societal developments are bringing a collaborative social manner, corporate culture is now being changed by digital technology through disruption and revolution which requires re-invented leadership. Companies using a digitally accomplished workforce are referred to as "digital masters" and see digital not as a technology challenge but as a transformation opportunity to use fast-moving technology to transform leading business practice (Westerman & Bonnet, 2015).

In their study, Neumeier, Wolf, and Oesterle (2017) found that it is not enough to merely adopt business models and digital business strategies to change a strategic organisation position at any cost; it also requires an improvement in capabilities that are flexible and adaptive in turbulent market environments. Matt et al. (2015) indicated that such elements as "technology," "value creation," and "structural change" along with "financial aspects" formulate a DT strategy that serves as a central concept to integrate the entire coordination, prioritisation, and implementation of DT within a firm. Organisations need to adopt digital characteristics — volatility, uncertainty, complexity, and ambiguity of general conditions and situations of business — to best understand the opportunities and risks today (Bongiorno, Rizzo, & Vaia, 2018; Snow, Fjelstad, & Lander, 2017). Furthermore, Andersson, Movin, Mähring, Teigland, and Wennberg (2018) argued that enhancing the competitive digital positioning of firms does not solely depend on technology nor its processes, but has a high component of leadership deployment.

DT is fundamentally more about strategy and upgrading strategic thinking (Rogers, 2016). Digital leaders tasked with focusing on automation and process improvements are required to reimagine and reinvent digital leadership across all business domains (Andersson et al., 2018; Reis, Amorim, Melão, & Matos, 2018). A wide gap remains between executives' intentions and the realisation of DT initiatives, especially relating to investments and strategy.

There is a lack of DT investigation concerning its primary challenges and how top management leads such programmes (Andersson et al., 2018; Ismail et al., 2017; Rogers, 2016). Davenport and Westerman (2018) investigated the performance of leaders in this digital era, providing evidence of high-profile failures due to the challenging nature of understanding DT complexities. von Kutzschenbach (2017) added that DT programmes do not have an enviable track record of success even though their potential is limitless stating, "Digital technologies have the potential to fundamentally transform the way people in their organisation work" (p. 102). Further citing Schon (1987), who highlighted a fundamental feature of organisations:

> In the swampy lowland, messy, confusing problems defy technical solution. The irony of this situation is that the problems of the high ground tend to be relatively unimportant to individuals or society at large, however great their technical interest may be, while in the swamp lie the problems of greatest human concern. (p.1)

The Main Players Leading Digital Transformation

Market complexities are causing conflicting demands on institutions, with a direct impact on leadership structure. The complexity and volatility in which organisations operate are due to market pressures of technology advancement and innovations that have changed the nature of the customer relationship as well as the way in which the customer is handled (Svejenova & Alvarez, 2016). As a result, organisations have raised C-suite positions with new executive titles that specialise in resolving institutional complexities (Svejenova & Alvarez, 2016).

The requirements to increase business performance through effective use of IT and investments in technology typically fall under the executive responsibility of the Chief Information Officer (CIO). Yet, research continues to report that most of these investments have not paid off as expected (Gerth & Peppard, 2016). Berghaus and Back (2017) argued that the critical challenges are at the initial phase — the "fuzzy front-end" where managers struggle with initiating the process and prioritising between activities. Weill and Woerner (2017) put forward business cases that recommended the CIO, Chief Digital Officer (CDO), and Chief Operating Officer as best placed to determine the priorities of the organisation, and further argued that the CEO plays an integral part in selecting

the right executive to lead the transformation.

Bonch (2016) and Tumbas, Berente, and Brocke (2018) further investigated the role of CDOs as the buffer between the IT function and areas undergoing the DT, and concluded that the CDO role is better suited to implementing digital innovations, innovative leadership, and transforming mind-sets. Hess, Matt, Benlian, and Wiesböck (2016) supported that, for those companies whose digital focus is on the interface with customers, the CDO should lead alongside the CIO, and together they should actively communicate and closely coordinate their strategies and initiatives.

Haffke, Kalgovas, and Benlian (2016) argued that DT has brought about redundancy between the CIO and CDO roles, therefore bringing the CIO role concerning DT to an inflexion point. Additionally, the authors highlighted that the responsibilities associated with these new roles were formerly part of the CIO role. They further noted that there remains a social alignment issue between CIOs and CEOs (Haffke et al., 2016). There are organisations frustrated by the perceived inabilities of their CIOs to drive the digital agenda, so some are now either replacing them or hiring CDOs specifically to drive the digital initiatives (Gerth & Peppard, 2016). Rickards, Smaje, and Sohoni (2015) explored the CDO role as the leader who aims to broker compromise and test new ways of operating across departments by directing purpose to the DT programme.

Additionally, CDOs are viewed as the institutional entrepreneurs who develop and articulate the logic of action and identify approaches that deal with existing organisational context (Tumbas et al., 2018). The CDO is frequently created with a direct reporting relationship to the CEO (Horlacher, 2016; Horlacher & Hess, 2016). Tumbas et al. (2018) explained that CDOs legitimise their role and mobilise resources through a contracting logic of action with those of the CIO, with contrasts being drawn across five dimensions: a focus of control, value orientation, goal achievement, value chain location, and reference industry. Conversely, these distinctions are approached differently by institutionalised CIOs (Horlacher, 2016).

Additional research on DT leadership shows the CDOs have been establishing themselves as the main transformers in the C-suite (Horlacher & Hess, 2016; Singh & Hess, 2017). Solving issues requires clear CDO roles that act across functions and understand the expectations of business functions to build relationships with customers and stakeholders (Chhachhi et al., 2016; Tumbas et al., 2018).

Digital Transformation Leadership Challenges

Kreutzer, Neugebauer, and Pattloch (2018) argued that the biggest challenge to DT is time. Its biggest enemy is the organisational and individual indolence, especially found in medium and large companies that block change processes. Initial research determined that DT is looked at as a technology change rather than a business change, thereby creating the challenge for leaders (World Economic Forum, 2015).

Kreutzer and Land (2014) indicated that responding to necessary changes in the environment is no longer about size, speed, conformity, or strength, but the survival of the smartest. They continued that it is an attack on existing business models, sales concepts, and marketing communication, and that executives are not considering these as an issue.

Neubauer, Tarling, and Wade (2017) argued that digital innovations speed up the pace of change and make it harder for leaders to create and sustain competitive advantage. They claimed leaders need to change, challenging the traditional views of a leader's character as authoritative and knowledgeable, and suggested the need for a more collaborative and engaging approach focused on empowerment of both individuals and teams. Goleman (2015) and Sahyaja and Sekhara Rao (2018) supported that, due to digitalisation, there are new variables — intellectual quotient (Q), emotional quotient (EQ), digital quotient (DQ), personal quality (PQ) — that affect leadership of digitalisation and determine the leadership styles and characteristics to better suit the digital era. The authors concluded that businesses are not ready for the digital age. Research evidences that only 44% of managers and executives believe their companies are adequately prepared for digital disruption (von Kutzschenbach, 2017). Worse, 50% of employees believe their company leaders are lagging behind in digital innovation (Lynch, 2016).

> **"The digital era of disruptive transformation is the catalyst that has influenced leaders to better clarify and communicate ideas to achieve improved solutions."**

Leadership needs to be aligned with digitalisation through the action of employee empowerment and a shift in culture (Ancarani & Di Mauro, 2018). Jakubik and Berazhny (2017) supported that new business environments require a new leadership paradigm that moves from egocentric towards altrocentric leadership, solving the challenges of collaboration and teamwork to create and enable high-performance teams. Leaders' challenges are associated with a lack of vision or an incremental vision concerning DT (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2013; Kane, Palmer, Nguyen, Kiron, & Buckley, 2015; Westerman et al., 2011). Furthermore, visions from top management need to be radical and transformative (Fitzgerald et al., 2013).

In addition, organisations pursuing digital opportunities face challenges in engaging a digital-talented workforce (Colbert, Yee, & George, 2016). Creusen, Gall, and Hackl (2017) suggested that, during the pre-navigation phase, considering the increased speed with which business ideas are realised in the digital domain and the fast-advancing technology, companies need to use agile working methods in conjunction with digital expertise to act quickly and flexibly. Lenka, Parida,

and Wincent (2017) argued that co-creating value with customers creates challenges within traditional industries, and changes in capability requirements of the workforce can support initiatives and innovations.

Within organisational decision areas, Ismail et al. (2017) concluded that it is imperative that there be buy-in from leaders and the board, especially as they articulate their vision and prepare roadmaps of execution. The authors further cited research undertaken by Kane et al. (2015) and Westerman et al. (2017), who argued that the top-down approach is preferable.

Effects of Digitalisation on Leadership

The effect of digital technology challenges requires leaders to proactively respond to the "new normal" in a world that is volatile, uncertain, complex, and ambiguous (Vogel & Hultin, 2018). According to Bolden and O'Regan (2016), leadership in the digital era requires the exercise of influence rather than excessive force and power. Furthermore, the authors underlined that leadership rules are being rewritten — no longer are charismatic, omniscient, and omnipotent leaders useful; a leader must know how and when to lead, support, coach, facilitate, and influence others. Hamilton, Tee, and Prince (2016) argued that the effects of DT on leadership calls for a framework structured on a combination of motivational tools and leadership styles that incorporate technopreneurial leadership and a transformational, transactional, and authentic leadership matrix. They further supported that through this matrix trichotomous leadership styles with digital age solutions can be found that provide the leader with insight into digital structuration and that demonstrate the steps required to attain digital leadership.

DT continually requires directive leadership (Hamilton et al., 2016). Further indications are that digital leadership in context has rules for competition to build cooperation between generations, close the gap between strategy and operations, attract the best talent, and solidify transformation in the corporation. Schwarzmüller, Brosi, Duman, and Welpe (2018) argued that new developments in the realm of DT are also crucially changing the way in which leadership is exerted in organisations. They highlight the importance of relationship-oriented leadership in leading DT. Regarding digital leadership, Wasono and Furinto (2018) stated that the concept is to create an effect that combines leadership skills and digital capability to optimise the benefit of digital technology in order to increase business performance. Hesse (2018) put forward that digitalisation is more than a technology trend that affects the underlying foundations of leadership, directly or indirectly challenging the boundaries especially for the new genre of leadership theories such as transformational, authentic, or servant leadership.

Wagner, Heil, Hellweg, and Schmedt (2019) argued that leaders need to re-examine the notion of work within organisations and create structures that incrementally enhance business and deliver disruptive innovation as well as challenge existing business models; this ambidexterity is regarded as the holy grail leaders need to survive digital transformation.

Leadership Style, Traits, and Personality Characteristics Associated with Digitalisation

Harkiolakis (2017) proposed that to operate in a competitive and changing environment requires entrepreneurs who function in unchartered territory and create something new from

environments with limited resources while being able to identify and exploit opportunities along a successfully determined network of paths. The author supported that entrepreneurial leadership theory provides the opportunity for exploring DT leadership.

Neubauer et al. (2017) proposed that the skills, competencies, and behaviours that leaders require to succeed are found in agile leaders who are humble, adaptable, visionary, and engaged. They continued to describe their personality characteristics as accepting feedback, acknowledging that others know more, being willing to change their minds, having a clear vision, and being open to communication and interaction from all stakeholders. Neubauer et al. (2017) argued for agile leadership traits and concluded that traditional organisations can compete and win in this new digitally disrupted world if their leaders are able to adapt.

Parr, Lanza, and Bernthal (2016) performed a personality assessment to determine the character profile of 2,461 executive-level leaders. Their research characterised different profiles of leaders based on their composite personality structures. They concluded that "there is not a 'one size fits all' personality model for leadership" (2016, p. 8) and that power players have emotional stability, are agreeable and conscientious, have socially creative communication, and are open to new ideas. Kane et al. (2018) argued that the best leaders possess common traits that developed their skills to lead DT across their organisations effectively. Traits cited were direction (providing vision and purpose), innovation (conditions to experiment), execution (empowering people), collaboration (across boundaries), inspirational leadership (getting people to follow), business judgment (making decisions in uncertainty), building talent (self-development), and influence (persuading and influencing stakeholders).

Avolio's (2007) accumulated research indicated that there are some universal characteristics and traits that leaders possess, offering that these are associated with effective leadership, including persistence, tolerance for ambiguity, self-confidence, drive, honesty, integrity, internal locus of control, achievement motivation, and cognitive ability. Judge, Bono, Ilies, and Gerhardt (2002) performed an extensive review of such leadership character traits across the leadership literature, noting that results of investigations relating personality traits to leadership have been inconsistent and often disappointing. Most reviews of the literature have concluded that the trait approach has fallen out of favour among leadership researchers.

Judge et al. (2002) argued that, although there is renewed interest in dispositional explanations associated with attitudes and behaviours, some researchers are still pessimistic in regards to the personality variables in leadership. Other researchers such as Conger and Kanungo (1998) explicitly mentioned the trait approach seldom replicated in studies due to it being "too simplistic" (p. 38). Judge et al. (2002) also referenced House and Aditya (1997), who through a social scientific theory of leadership came to the same consensus with the scholarly leadership community, and stated: "It appeared that the search for universal traits was futile" (Judge et al., 2002, p. 410). The authors further noted that this was due to it being the early stages in investigation of the phenomena. George, Sims, Mclean, and Mayer (2011) interviewed and reviewed 1,000 studies on leadership and analysed 3,000 pages of transcripts to determine the profile of a good leader. They stated that their team was startled to see no identifiable or universal characteristics, traits, skills, or style that lead to their success.

How Leadership Deals with the Complexities of Digital Transformation

Harkiolakis (2017) categorised leadership by characteristics that are considered to define the best leaders and argued that such categorisations need to minimise any biases associated with gender, social status, education, and other demographics to achieve a more representative sampling of the leadership population. OECD (2018) further argued for positive gender selection of women leaders in the digital age.

Sow and Aborbie (2018) claimed that a leader's style influences an organisation's direction regarding how it handles the complexities associated with DT. They further noted that the style of leadership is critical in employee-based involvement and efforts to deal with change. Leadership styles are influential in organisations and can implement norms, expectations, and desirable outcomes during large-scale complex transformative projects. El Sawy et al. (2016) argued leaders do the right things for the strategic success of digitalisation, by thinking differently across complexities pertaining to business strategies, business models, enterprise platforms, mind-sets, and skill sets along with the IT function and the workplace. The scale and complexity of transformation requires an immense shift in understanding leadership of ourselves, our team, and entire organisations providing new opportunities but presents human resources challenges (Lohrmann, 2017). Kohnke (2017) argued that along with capabilities it is crucial for leaders to understand the implication for employees, with attention focused on new skills and competencies and new forms of leadership.

Methodology and Design

Sample

The study's unit of analysis is the individuals leading the planning and implementation of DT programmes and initiatives in and across their organisations. The population included all individual decision-makers, so including but not limited to top executives and senior managers. The industries were hotel hospitality, healthcare, pharmaceutical, and banking within medium and large organisations based in France. The participants were purposively selected managers, senior management representatives, and executives with relevant backgrounds and active in DT initiatives (Patton, 1990).

Procedure

The data collection method was in-depth semi-structured interviews. The eight individuals were purposefully selected to represent a range of leadership functional areas directly associated with or affected by DTs. These participants were recruited via professional network and LinkedIn professional network connections (Aral, Dellarocas, & Godes, 2013).

The following research questions were adopted:

RQ1: What do practitioners of digital transformation consider as key elements for the successful

implementation of digital transformation initiatives in medium and large organisations in France?

RQ2: What leadership styles, characteristics, and traits enable the successful implementation of digital transformation programmes in business organisations?

Participants' Demographics

Males made up the majority of the participant sample, with five females represented in total with one at senior, three at mid-level, and one at operational levels of leadership. This suggests a gender bias of the results towards males (OECD, 2018). The participants' experience associated with DT ranged between a minimum of 2 years and a maximum of 30 years in leading DT initiatives across their organisation. This is an indication that the results are not biased with respect to years of experience. Regarding the distribution of participants' educational levels, the highest qualification was held by a female with a doctoral degree; 12 held master's degrees, 5 held bachelor's degrees, and 1 male held a high school and professional certification. The participants were all educated and qualified for their positions, which adds to the credibility of the study.

Participants' job titles associated with DT ranged from Chief Digital Officer, Chief Information Officer, to Director, Vice President, Manager and IT Architect, and Head of Customer Experience. Each job role was associated with a team size of between 3 and 2,000 employees and directly contributed towards DT planning and implementation of digital initiatives. Participants associated themselves with the following leadership styles: strategic, adaptive/servant, driver, democratic/collaborative, directive, visionary, optimistic along with participative/strategic, coaching, trusting, and co-construction. Three participants believed that their leadership styles were either adaptive or collaborative while two indicated their styles were either strategic, democratic, or visionary. Within the sample population of participants, the technology experience in relation to DT ranged from a minimum of 2 years to a maximum of 30 years. The sample selected participants from different industries' sectors and departments with a focus on planning and implementing DT initiatives; as leaders, these participants provided a reliable sample covering different aspects of DT programmes.

Implications and Recommendations

The problem that this research investigated is that executives and managers cannot successfully address challenges associated with the execution of DT in their organisations. In the literature, a gap was identified and explored between executives' leadership intentions, realisation, and the explanatory effects of knowledge. The analysis of words and phrases of these professional participants conveyed a deep understanding of their organisations' context at undertaking planning and implementation of DT initiatives. This qualitative multiple case study identified those optimal leadership styles, characteristics, and traits that enable the successful implementation of DT programmes in organisations headquartered in France.

Implications

The implications of this research as suggested from its findings are that organisations need a formal vision or similar statement about DT to be communicated from senior executive positions such as the CEO, CDO, or CIO that improves customer engagement. For example, Participant 2a, a CIO, stated: *Yes clearly, it is to change the business model of the company. It is a large part of the strategy to manage digital transformation as an impact strategy. The statement comes from leadership to be an enabler for all business lines of the company to support their digital strategies. It is a very precise strategy on documents. There is a clear operational strategy that was communicated and documented.* As such, this study's findings contribute knowledge that can be used to extend theory and thus have implications for practice regarding organisational communication approaches that need to be implemented for DT transformation.

The findings of this research also have implications for theory related to personal and professional development. DT initiatives now require leaders at all levels to engage with their development using instruments that detail areas of action, helping them to make sense of DT requirements, and this serves as a boundary object to communicate goals. Participant 2a explained her involvement in the DT projects as follows: *Given my role as a transformational leader specific in the area, I usually get hired by the executive when they make the decision that they need to do it, but they don't know how, when, what… and they are looking for a leader to come in and really detail out a strategy and then put a roadmap together to get the organisation there.*

With respect to leadership styles, participants indicated that leaders need to operate cross-functionally, be people-oriented, and possess and communicate a clear vision that is prepared for significant disruption from legacy systems and migrating systems towards data-driven digital platforms. Participant 6b explained his detailed involvement in DT projects: *Yes, I had the chance to work on the IT part of the digital transformation systems in the beginning mainly by designing the change from legacy systems to customer-oriented mobile applications as well as providing technical facilities for customer services so that they can be more reactive through social media in real time as well as keeping IT along with improving the image of the organisation from outside the company via social media interfaces and improving technologies with a specialist focus on data science.*

The study results have implications for practice regarding reducing the length of time taken to complete initiatives. Participants indicated that the average time spent ranged from 2 to 3 years (40%). The implication for achieving digital maturity from 2 years to 3 years has to do with leadership commitments to digital development and leadership support.

With respect to senior initiators of DT projects, there is a need for candidates with capabilities, competencies, and core leadership skills for planning initiatives. Executives and managers need to create agile teams with capabilities and the mind-set to create value. Goal achievements depend on several factors, including the stage of maturity, the types of initiatives being undertaken, the value of initiatives, and the structure of teams focused on customer experience. Participant 2c noted: *To change the digital transformation it's a business model, management model and a technology model transformation*

that requires a clear vision and a digital mind-set that is led to from the top, and implemented through autonomous teams that innovate to give us additional business opportunities.

The meaning of DT, fully understanding its impact on job roles, the connection with technology and direct use of the cloud, and its significance for social media and the use of digital tools have direct bearing on how teams work together, cross-functionally or across different geographic boundaries. Participant 1a stated: *In summary, DT is used [for] leveraging all forms of data, information that is able to be crafted into an efficient and effective organisational and operational structure whose effort achieves a superior customer-centric outcome.* The aim, according to participants, is to engage more with their people and improve plans associated with customer experience through increased team collaboration to achieve results. Participant 2a explained by indicating how they quantify achievements of their initiatives, stating: *In my team, I get the quantifiable goals and we really track against it and set those as the targets. It's setting the right impact goals that are more meaningful to the business and drive more the adoption, but you can see other digital transformation goals tend to be about activity-based data, measures without quantification, without true impact.*

Essentially, for successful implementation, a clearly defined vision, strategy, and implementation plan is needed as well as a roadmap detailing transformation through a clear language that is common to everyone involved. Participant 5a expressed their meaning of success, stating it is *to define clearly and have alignment across the whole organisation on what it means to be digital…to have faster, leaner, more efficient communication and engagement between us…invest in training for people to understand…so we need to train people, to build capacity because you cannot implement anything without capacity, without investing in knowledge and changing mind-sets.*

This research underlines the opportunities and benefits that DT allows to improve work processes, speed, and the ability to experiment and fail fast. Additionally, the findings show it enables achievement of the cultural and structural changes associated with creating combinations of millennial and mature team members. Participant 1a's statement demonstrates the related implications: *Having as much efficiency and effectiveness across our organisation which means being aligned in terms of our operations and our efforts [to] be able to have an organisation-wide effort.* Participant 1c further stated: *Cultural change, people see the cultural impact of a DT.* Participant 2a said: *You understand your customers better and you can respond to them in a more precise manner.*

The findings of this research further have implications associated with innovation and optimisation of legacy systems as well as increased investment to build digital assets. Participant 2c noted: *To optimise our productivity opportunities is through innovation, to increase or to enlarge our assets close to hospitality…for the team to take decisions to fail fast and to try again.* This is a clear indication of the implication of not being successful in implementing digital initiatives.

Further, study results highlight the implication of challenges in implementing DT, which participants regarded to be changing mind-sets, breaking team silos, and shifting the culture of the organisation. The findings also have implications for employee knowledge sharing, opportunities to be constantly connected to the workplace through cloud services and mobile devices, and the ability to communicate with others via instant message, with customers through social media, and with regional teams through teleconferencing. Additionally, there is a need to get everyone around the table. Participant 1a stated: *Some of the key challenges faced are leadership commitment and buy-in. That has been the primary struggle. The second is change management as a whole, along with legal and compliance concerns that arise through digital transformation due to its poorly understood nature or those possibilities that are not considered as a new business model.*

Recommendations for Practice

The results and findings of this research suggest an organisation's vision statement on DT derived from executives needs a strategic planning and implementation process that ensures each level of the organisation understands what DT means to them. Company executives need to provide answers to leaders on the new structural changes required for DT. In light of what was found in this study, this can be achieved through increased training where leaders address the expectations of stakeholders and partners by clearly defining a roadmap, clarity of intention, and a reiteration of top-level commitment.

Study results further indicate that leaders need to continuously experiment with digital innovations to include fail-fast and accelerated scenarios for digital innovations as a pre-defined part of a vision with clearly defined roles and responsibilities for all teams and stakeholders who assume the role of digital catalysts. From an internal operational perspective, the findings demonstrate why leaders must have greater influence on the employment policies of their teams' construction to align with modern organisational norms, thereby improving gender and generational gaps in teams as well as aligning with IT acquisitions and building specialised know-how and new digital competencies across business units. Leading DT requires a centralised core that maintains influence and power across decentralised business units. Such units need autonomy in decision-making on digital strategies; digital leaders need to have a high level of entrepreneurial leadership accomplishment to overcome the challenges and exploit opportunities.

Based on these research findings, it is clear that unit managers need to assess the role of their IT departments and how proactive they are in their approach to new technologies. Such units need to act as a service provider rather than in their current static nature; this way, unit managers have increased strategic options from which choices can be made. From the employee perspective, the study showed that individuals associated with the deployment and planning of DT initiatives are committed in that they use the tools for collaboration with other employees across regions, engage with external partners, and promote their digital solutions to external stakeholders to demonstrate best practice on customer engagement and improved customer journeys.

It is clear that leaders need to find ways to understand the digital process and get better acquainted with digital tools associated

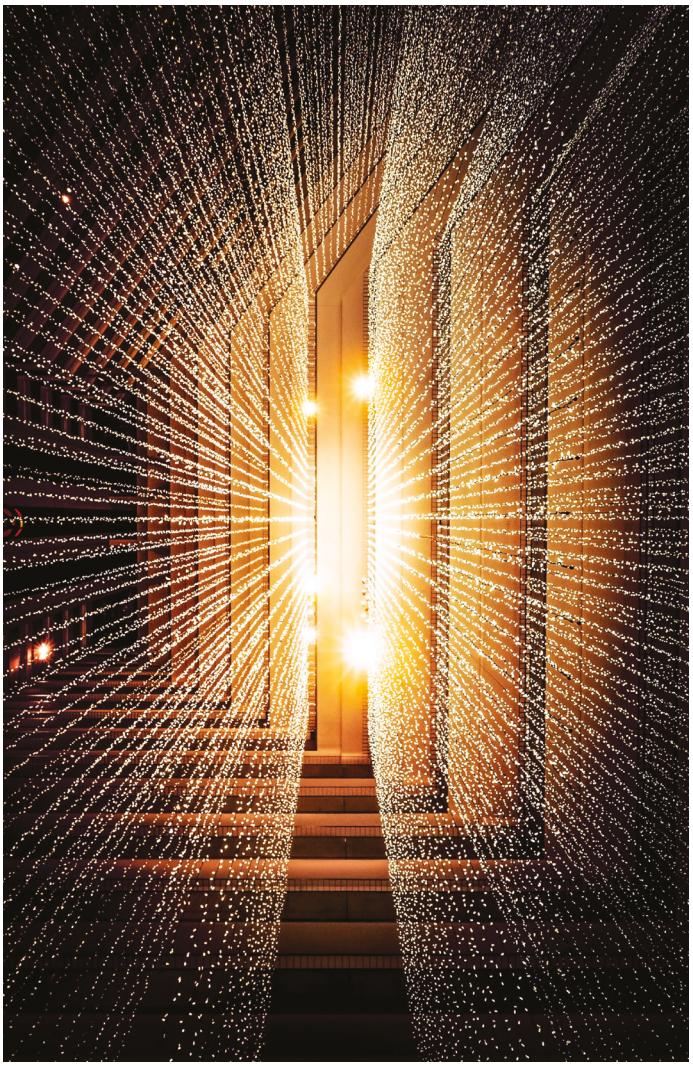
with key areas of performance. Leaders have the opportunities to leverage the affinity and openness of the workforce to adapt their leadership styles, characteristics, and traits and to increase their involvement in the DT process.

Recommendations for Future Research

Future research could explore the phenomenon of DT within organisations of varying sizes and covering a wider geographic region and industries. This can be done using alternative methodologies that include quantitative and mixed methods approaches. An additional focus on gender could also be explored to determine if there are differences between men and women related to leadership styles and approaches to DT as well as their experiences in the implementation of DT initiatives and the barriers or challenges they may be confronted with in relation to their gender.

Future research could extend the ideas of the International Monetary Fund's research on gender, technology, and the future of work (Brussevich et al., 2018). This could generate greater understanding of how today's employees envision future workplaces in the context of shifting demographics, emerging work practices (e.g., remote work, online collaboration), increasingly international and multicultural companies, and emerging economies and new financial realities.

Lastly, research could explore this area from an internal perspective by investigating the cultural change dimension that leadership and DT bring to an organisation. Such an investigation could delve into the culture of learning and what it takes to develop learning cultures associated with DT and leadership.



Conclusion

This study has addressed the problems associated with the critical failures of many practitioners involved in planning and implementing DT initiatives by providing the explanatory detail needed to create an environment that is cross-functional, co-creates value between business and technology, and builds team cohesion from top-down and bottom-up through teams' communication of their experiences of how best to plan and implement initiatives. It can be concluded that within organisational practice individuals need to lead DT from the formation of teams that include individuals with skills and a willingness to learn digital technologies. It has now become imperative for leaders leading in this new digital era to improve the vision, communicate effectively, and include ideas from both team members and all stakeholders across the organisation. This will see increased support and cooperatio for initiatives and provide a greater understanding of DT's val One could argue that the digital era of disruptive transformation is the catalyst that has influenced leaders to better clarify and communicate ideas to achieve improved solutions that stem from increased cooperation and co-creating value, and built through increased cross-functional relationships using a leadership style that is open and authentic. The results of this study have indicated that, even though leading DT may be considered messy and a confusing problem, it is not an impossible feat to address with the right adjustments from leaders on leadership style and implementation approaches (von Kutzschenbach, 2017). The results of this research contribute to the literature in this area and issues associated with technologies considered to be disruptive.

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Fouad Kazim is a Chartered Manager of CMI and entrepreneur. His earlier career extends from the world of finance and financial services, in firms such as City Fund Management, Prebon Yamanie, Bloomberg LP, and Kalahari Software Solutions. In 2009, he left London and moved to Paris to launch and co-found with Béatrice Querette merchanfeeling.com and Trendfeeling.com. Fouad serves as co-CEO and CDO at both companies.

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