

Digital Transformation in Marketing through a Customer Knowledge Management Approach for Startups and SMEs: An EdTech Startup Case Study

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Abstract—Technologies are transforming marketing organizations; and exploiting the full potential of this transformation is one of the key challenges for startups and Small and Medium Enterprises (SMEs) requiring a holistic management approach towards Knowledge Management (KM) in the digital context. This paper addresses a central question from a resource-based perspective: how startups and SMEs with inadequate capabilities and limited resources drive digital transformation in marketing? Customer Knowledge Management (CKM) which integrates approaches from Knowledge Management and Customer Relationship Management (CRM) can play an important role towards this goal. This paper examines the evolving role of data sciences in relation to marketing for effective Customer Knowledge Management in startups and SMEs. Adopting a case study methodology in EdTech startup based in Egypt, this paper suggests technological tools that help startups and SMEs with limited resources and capabilities take advantage of data sciences in relation to marketing and extract valuable customer knowledge to improve CRM effectiveness. The case study also sheds some light on the relevant organizational factors that could help such organizations align the CRM business processes with IT infrastructure. This research provides some guidance, from an organizational perspective, to startups and SMEs in their digital transformation in marketing.

Index Terms—CRM, customer knowledge management, data science, digital transformation.

I. INTRODUCTION

Leveraging technologies and digital transformation is a key challenge for startups and SMEs. The key challenge for startups and SMEs to exploit the potential of digital transformation is by having a holistic management approach towards Knowledge Management in the digital context [1], [2]. Successful digital transformations require companies to foster new organizational capabilities [3], [4]. Currently, there is a need for research that supports firms by providing guidance on the assessment of their existing technological capabilities and on procedures to evaluate their current options and on how the alignment of IT strategies with other functional and operational strategies can be conducted in practice from an organizational perspective [2], [3]. Research should also establish further evidence on how entrepreneurs of SMEs with inadequate capabilities and limited resources can drive digital transformation in their companies [4]. Existing research in entrepreneurship has largely neglected

the role of digital technologies in entrepreneurial pursuits [5]. Little attention has been made to the role of big data in marketing activities [6]. This paper aims to answer the following question: From a resource-based perspective, how startups and SMEs with inadequate capabilities and limited resources drive digital transformation in marketing? In particular, we examine the evolving role of Data Sciences in relation to Marketing for effective Customer Knowledge Management in startups and SMEs. Adopting a case study methodology in EdTech startup based in Egypt, this paper suggests technological tools that could fit smoothly within the capabilities of startups and SMEs to take advantage of Data Sciences in relation to Marketing and extract valuable customer knowledge to improve CRM effectiveness. The case study also sheds light on relevant organizational factors that could help them align the CRM business processes with IT infrastructure. This paper provides some guidance, from an organizational perspective, to startups and SMEs in the digital transformation of marketing.

At first, a review of the literature presents relevant elements concerning digital transformation in marketing and Customer Knowledge Management. Subsequent sections present the theoretical framework, the research methodology, the case study, and the research findings. The paper concludes with a summary, the research contributions, a critical reflection, and an outlook on further research possibilities.

II. LITERATURE REVIEW

A. Digital Transformation in Marketing

In this study, Digital Transformation is defined as transformation “precipitated by a transformational information technology” [7]. Such transformation entails fundamental changes in business processes [8], operational routines [9], and organizational capabilities [10]. Digital transformation underlines the impact of IT on organizational structure, routines, information flow [11], and organizational capabilities to accommodate and adapt to IT [12]. Accordingly, digital transformation emphasizes more the technological root of IT [7] and the alignment between IT and businesses [8]. To fully take advantage of IT, enterprises need to build not only IT capabilities but also complementary capabilities such as IT human capability or new service delivery capabilities [13].

This paper focuses on digital transformation in marketing. The increasing globalization of markets is strongly associated with an increase in information producing,

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information manipulating, information distributing, and information consuming technologies [14]. These are considered the most important contemporary transformative processes which lead companies to change their traditional marketing activities and organizational structures. Information is transformed into a corporate asset and its acquisition, management, and distribution are tasks that marketing should perform effectively and efficiently [15]-[17] especially in a dynamic and knowledge rich environment. Knowledge about customers' behavior, preferences, challenges, and interests are becoming important sources of competitive advantage [18], [19].

B. Customer Knowledge Management and CRM Effectiveness

Customer Knowledge Management is defined as a process of capture and/or creation, sharing and dissemination, acquisition, and application of Customer Knowledge [20] to create value for the organization and its customers [21]. Customer Knowledge is defined as a dynamic and necessary combination of experiences, values, information scenarios, ideas, and expertise, which is created and observed in the transaction and exchange processes between the organization and its customers [22]. Customer Relationship Management and Knowledge Management are two management approaches with different disciplinary roots and perspectives but integrating them to manage Customer Knowledge has the potential to produce great synergies [23]. CRM is an approach with increased strategic significance which aims to manage customer related knowledge [24]. Marketing, sales and customer service are the company's primary functions with a high degree of direct customer interaction and knowledge-intensity [25], making them the main targets for the Customer Relationship Management. The relevant business processes are the campaign management, lead management, offer management, contract management, complaints and service management, and opportunity management [26].

The metrics commonly used by companies to measure and monitor CRM performance include customer satisfaction, customer loyalty, acquisition costs, defection rate, retention rate and other indicators [27], [28]. This paper presents technological tools that help startups and SMEs take advantage of Data Sciences in relation to Marketing and extract valuable customer knowledge to improve CRM effectiveness. Previous studies have shown that CKM application enhance the company performance [29], [30] and competitiveness [31]. CKM could help organizations better understand its customers [21], [32], allowing them to enhance their marketing strategies and to increase their sales [33]. CKM could support organizations in improving their customer service with the aim of achieving customer satisfaction and retention [34]. Moreover, customization of products and services is expected from customers due to their knowledge that organizations possess big data [35]. This is typically achieved by exploiting Datamining (DM) techniques, exploring patterns about customers, and consequently achieve effective CRM.

C. Data Sciences and CKM for Startups and SMEs

The Data Sciences term coincides with the term Big Data. Big Data simply put is made up of raw "little data." Generally, these little data give deep personal insight into a consumer's personal and buying profile, and the consumer's behaviors [36]. Customer is at the heart of any business. Recently, marketing has become a field for experiments with Big Data [37]. Today, SMEs and marketers are gathering information about customers from different sources such as social media, mobile devices, and internet surfing [38] leading to what is called Big Data stores. When BD is properly interpreted and managed, marketers can access an array of opportunities to properly manage the Customer Knowledge.

It is critical that customer-focused companies are required to offer knowledge that customers demand, administer the knowledge that customers circulate to the company and manages knowledge about customer [39]. Obviously, social media analytics is an important component of customer big data analytics that aims at enhancing marketing strategies. Facebook and Twitter gave consumers the chance to like, follow, and comment spontaneously with their peers about their favorite or least favorite products, and brands [40], [41]. Companies armed with the insights generated by BD could be more agile, adaptable, and highly responsive to business needs and unexpected opportunities [42]. Big data analytics supports firms in the extraction of significant consumers' insights to support marketing-related decisions (e.g., Google Cloud and Microsoft Azure) [43].

SMEs are a powerful agent for industrial growth and undoubtedly, overall economic development. [44]. Earlier, the term Big Data or Knowledge Management was often associated with big brands such as Google, Amazon, Microsoft, etc. As stated in [45], advancement of technology such as cloud computing and Software-as-a-Service (SaaS) democratized the access to the latest technologies for Small and Medium Enterprises. Thus, enabling SMEs to manage the data flow and streamline their operations towards an improved customer experience. In general, some characteristics are needed for SMEs to deploy data sciences and big data analytics. As stated in [44] first, flexibility and choice are key, a big-data solution for small businesses must allow them to only select the capabilities that fits their needs and align with the systems in place. Second, simplicity, a big-data solution must be easy to deploy. Lastly, cost must be relevant and priced right for the needs and only the capabilities that will be used by SMEs. The real challenge as indicated is about choosing the right tools and the scalable ones to support the nature, and business growth of SMEs [44]. Later in the case study, we present how startups and SMEs can benefit from knowledge management as well as utilize big data for value creation. It might be true that SMEs cannot develop their own suite of cloud-based collaboration or AI-powered call centers, but they can capitalize and adapt knowledge to benefit from such technologies [46].

III. THEORETICAL FRAMEWORK: THE RESOURCE BASED VIEW

Customer knowledge is a vital organizational resource that organizations could manage to improve innovation, and support research and development [47]. From a resource

based view [48], [49], customer knowledge could be a valuable and rare asset for companies allowing them to respond quickly to customer needs and to achieve a competitive advantage [31]. Sustainable competitive advantage comes from resources and capabilities, controlled by the company, that are valuable, rare, and not substitutable. These resources and capabilities could be considered as sets of tangible and intangible assets; including business management skills, organizational processes and routines, and the information and knowledge that it controls [50]. In this perspective, this study intends to present the technological tools that help SMEs take advantage of data sciences in relation to marketing for effective Customer Knowledge Management within CRM business processes. Furthermore, we explore the organizational factors, including management approaches and routines, which support smooth implementation of digital transformation in marketing.

IV. RESEARCH METHODOLOGY

The research methodology is based on a qualitative approach, by adopting the case study research method [51]. The choice of the case method was motivated by the fact that the study of the role of technological tools, data sciences in marketing, and organizational capabilities for successful digital transformation in startups and SMEs represents a contemporary phenomenon [5], [6] in a context of real life [51]. In addition, this method allows the study the phenomenon in greater depth than a large-scale survey or an experimental research [52].

A. Presentation of the Case Study

“Orcas” is an EdTech startup, established in Egypt in 2013, as an online marketplace that allows parents to search and find trusted, trained, and experienced tutors and language instructors in their area. It aims to make parents’ lives easier by providing safe and efficient educational services. The company has 45 employees and operates mainly in the largest two major metropolitan areas in Egypt: Cairo and Alexandria. “Orcas” has over 2000 trained, experienced and reliable tutor profiles that have been background checked and received ratings and reviews from previous clients. Parents get to choose based on the relevant location, age group, experience, and language of the tutor from this wide range of profiles. “Orcas” goal is to create experiences that foster the growth and development of children as well as ensuring a safe environment for the children and the team of instructors similar to a home environment. “Orcas” has demonstrated its potential as a successful application with a major growth (300%) in the number of paying customers in 2019 after Algebra Venture invested \$500,000 in their mobile application. “Orcas” realized this success by deploying simple technological tools enabling them to take advantage of data sciences in relation to marketing and capitalize on its customer knowledge. That makes this case highly relevant for the research objective.

B. Data Collection

Two different techniques of data collection have been used: semi-structured interviews as well as direct observation:

1) Semi-structured interviews

Fourteen interviews were conducted with the core functions involved in the processes of the Customer Relationship Management (marketing, sales, customer service). A part of the interview guide was dedicated for the technological tools used by “Orcas” to smoothen the CKM process therefore results in an effective CRM.

2) Direct observation

Two-months observational study (March and April 2020) was also conducted to observe the usage of the technological tools, how IT is aligned with the CRM business needs and the organizational factors that support the Customer Knowledge Management process.

Secondary data (e.g., archival documents, website, mobile application, and social media platforms) were also accessed to extend our empirical analysis.

C. Data Analysis

Most interviews were recorded (a total of 7 hours). They were transcribed to carry out the coding and the analysis of the data. The authors investigated the technological tools supporting Customer Knowledge Management through the CRM business processes, the organizational factors that support the CKM process and thus the alignment between IT infrastructure and CRM business processes.

V. RESEARCH FINDINGS

“Orcas” used effectively relevant technological tools taking advantage of data sciences in relation to marketing by extracting valuable customer knowledge to improve its CRM effectiveness. “Orcas” has a well-founded digital platform that leverage social media such as Facebook, Instagram, and LinkedIn. Not to mention, it has an online presence through its mobile application that can be found in Google Play and Apple Store, and website¹. At “Orcas”, experience proved the effectiveness of online marketing activities such as Google ads, Search Engine Optimization (SEO), Facebook ads, content marketing, and App Store Optimization (ASO). “Orcas” managed to integrate data sciences to capitalize on customer knowledge through its online platforms to improve its Customer Relationship Management, leading to a proper selection of the technological tools to support their customer centric approach and their business needs.

A. Technological Tools Supporting Data Science in Relation to Marketing and Customer Knowledge Management for Effective CRM.

“Orcas” uses multiple tools for proper Customer Knowledge Management and CRM Effectiveness. Tools include Zoho CRM which was mainly used to gather customers feedback and detect any problems or complaints. It is an essential tool for complaints management. Zoho CRM is also used to convert leads, boost sales, increase customer acquisition, and effectively manage customer information. Mix Panel was mainly used to track customers interactions and transactions through the mobile application and the website, in addition to analyzing the customers’ responses

¹ <https://www.orcas.io/about-orcas>

through the survey forms and in-app tests; these data are then used to build customer reports and measure customer engagement. At “Orcas”, Mix Panel is essentially used for offer management, lead management, and campaign management as well. Moreover, Tableau was used as a data visualization tool to support the analysis and visualization of data in a simple understandable and speedy manner. “Orcas” used it for data analysis and translating this data into an understandable format in the form of worksheets and dashboards. Extracted data was then saved and shared between different departments in the form of Google sheets and documents on Google Drive. For “Orcas”, Google Dashboards was an adequate tool to support managing the business processes between different departments as well as managing feedback and concerns from customers. To support better CRM, Slack was used for easy and smooth internal communication among departments and to share customer knowledge. Moreover, only one information system was used in the form of Google sheets and documents on Google Drive. Both include the results and reports extracted from the previously mentioned IT tools, shared between all departments, and could be easily accessed. This information system facilitates the knowledge flow between different departments and accelerates their work which leads to an effective CRM process.

Datamining and data analysis are significant KM techniques that support the KM process for employees and provide the CRM processes with accurate, clear and organized reports and graphs. Therefore, “Orcas” usage of analytical tools such as Mix Panel and Tableau help in tracking received requests (Offer management), conversion rate (Lead management), customers’ engagement and feedback (Campaign management). Through data mining they gather the customers’ feedback and reviews on the application to stand on the level of satisfaction for each specific service and take immediate remedial actions. Also, those KM techniques help the employees gather organized information and insights from the customers’ transaction history, so their customer knowledge is enhanced and met adequately. The tools enable the data analysis process and enhance the CKM, moreover reaching an effective CRM that helps in maintaining long-term relationships with customers.

B. Alignment of Technological Tools with CRM Business Processes

“Orcas” integrated its customer knowledge to support its CRM business processes effectively. At “Orcas”, the process of lead and offer management uses customer knowledge and achieves CRM effectiveness, which is consequently reflected in an increase in the number of requests, prospects quality, and number of users (Conversion rate). The CRM also helps maintain customer satisfaction and enhance offered services. Moreover, for campaign management, “Orcas” uses customer knowledge to collect leads, provide quality tutors, build brand image, increase users’ satisfaction, and build customer-oriented company. As for the customer service reflected in contract, service, complaint, and opportunity management, “Orcas” uses customer knowledge to improve service process and increase customer satisfaction and retention. Table I represents a summary on how

technological tools are aligned with the CRM business processes to manage customer knowledge for effective CRM at “Orcas”.

TABLE I: ALIGNMENT OF TECHNOLOGICAL TOOLS WITH CRM BUSINESS PROCESSES

Technological Tools	CRM Business Processes	CRM Effectiveness
Zoho CRM	Gather feedback from the customers to stand on any problems/complaints faced. (Complaint Management) Furthermore, it is used to evaluate applicants fit for tutoring.	Address and solve swiftly issues faced by the customers. Provide the best tutors to satisfy customers’ needs and provide excellent levels of customer satisfaction.
Mix Panel (2018)	Track customer transactions, requests, and engagement. (Lead and Offer Management) Build customer reports and measure customer engagement. Provide useful information prior launching a marketing campaign (Campaign Management)	Encourage customers to place requests and use “Orcas”. Provide customers with information about the best tutors, new categories, and packages available that satisfy their needs to improve customer experience and consequently retention rate.
Tableau (2019)	Used for data analysis and translating the data in the form of worksheets and dashboards. Helps top management in the decision-making process and improve service when relevant. (Opportunity Management)	Improve the service level leading to better customer satisfaction and retention.
Slack	Provides an easy and smooth internal communication among departments along with sharing information.	Accelerates users’ work and improve customer experience.
Google Drive	Easily can access and share Google sheets and documents which ensures knowledge sharing and accelerate the business process.	Effectively manage customer requests, improve responsiveness, and enrich the customer experience

C. Organizational Factors Supporting Digital Transformation in Marketing

At “Orcas” it is not only about technological tools and relevant digital platforms; “Orcas” is adapting a customer centric approach, where the customer is at the heart of the business. Some important organizational factors were essential to lead its digital transformation journey.

1) Culture: Customer-orientation

Customer-orientation consists a continuous understanding of the needs of current and potential target customers and the use of this knowledge [52]. “Orcas” shares a customer-oriented culture; all decisions and marketing activities revolve around customer’s information, feedback, and ideas.

2) Strategy: Top management support

Top management support is reflected in increased

investment into technological tools and infrastructure. Continuous technical training for employees makes the CRM process more efficient and deliver the best results to the end users (the customers). “Orcas” top management are constantly supporting their employees and try to facilitate the knowledge sharing process. At first, they started using Zoho CRM and Mix Panel systems, then the top management decided to increase their investment in technological tools and added the subscription of Tableau. The company now invest nearly \$2,000 annually on technological tools.

3) Structure: Team structure, cross functionally and evaluation systems

“Orcas” is a startup which follows a team structure in each department to encourage knowledge sharing between team members and the different functions as well. The marketing department helps the sales department collect leads through surveys and then send those leads to the sales department in order to contact them and encourage those leads to take the requested action. The sales team collects information about the customer mainly through the app as the user signs up. The information includes name, email, phone number, number of children, etc. also, as the user navigates the app and starts searching for what suits them, the sales team follow up the categories they searched for and their interests. Information is then passed from the sales teams to the customer service team in order to help them better understand the customers and accelerate their services.

Moreover, evaluation and reward systems are implemented in “Orcas” to encourage employees to share customer knowledge and to do their best in order to satisfy and retain the customers. These systems are mainly based on the customers’ satisfaction and ratings for each tutor. These organizational factors on the culture, strategy and structure levels supported the CKM and help for better alignment between IT infrastructure and business needs (CRM business processes).

VI. CONCLUSION

The case study of “Orcas” demonstrated how a small-scale business- with inadequate and limited resources- can capitalize on Data Science and technology to effectively manage the flow of customer knowledge and smoothly implement digital transformation in marketing. The case study presented how the CRM functions leverage the Customer Knowledge Management cycle through its technological tools to create value. Therefore, SMEs can benefit from simple tools and applications such as Zoho CRM, Mix Panel analytical tool, Google Dashboard, Tableau as a data visualization tool used for Business Intelligence. As stated by Reference [44], big data solutions must demonstrate simplicity, and cost must be relevant and priced right for the needs and only the capabilities that will be used by SMEs.

Customer Knowledge is an essential organizational resource. It is showed that “Orcas” has applied the Customer Knowledge through the CRM business processes to enable the startup to sustain its competitive advantage based on Data Science and knowledge management. Customer Knowledge Management through relevant

technological tools has enabled them to improve their marketing, sales strategies, customer service, in addition to some organizational factors that support the alignment between IT infrastructure and CRM business processes enabling smooth implementation of digital transformation in marketing.

There is no doubt that information technologies such as workflow management systems and data mining techniques can facilitate KM processes [53], [54]. CRM systems make it easier to acquire, analyze, transfer and use knowledge related to customer behavior [55], [56]. Beside the technology part, in line with previous studies, the organizational factors that support the CKM at “Orcas” were cultural, strategic and structural factors. A large number of studies [2], [34], [57], revealed that the organizational variables; customer orientation and organizational culture of collaboration and knowledge sharing, strategy and top management support, organizational structure and inter-functional integration, are the key success factors of CRM. These organizational factors mediate the impact of other factors including KM capabilities and technological support on the success of CRM [34], [58], [59]. Startups and SMEs can leverage the potential of digital transformation in marketing by having a holistic management approach towards CKM.

VII. CONTRIBUTIONS AND FUTURE RESEARCH

This research has contributed to the need of further evidence on how entrepreneurs of SMEs can drive digital transformation in their companies [4], along with the role of digital technologies in entrepreneurial pursuits [5] and big data in marketing activities [6]. In addition, the paper has answered the call for guidance on how the alignment of IT strategies with other functional and operational strategies can be conducted in practice from organizational perspective [3], [2]. From a managerial perspective, this study will help startups and SMEs to implement successful digital transformation in marketing. The case study of “Orcas” as a successful startup revealed certain best practices in the areas of KM and CRM.

The study does have some limitations, many of which highlight potential opportunities for future research. The study is based on a single case according to the research objective to examine in-depth the evolving role of Data Science in relation to Marketing in startups and SMEs and thus explore the organizational factors which support smooth implementation of digital transformation in marketing. The research is focused specifically on an Egyptian EdTech startup, so studies at the international level and within other industries would be useful to test the generalization of the findings from other countries and industries. Quantitative studies at large scale would be also interesting.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Both authors have contributed equally in all the activities towards developing the paper. Both authors approved this

final version.

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