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Application of Artificial Intelligence and Machine Learning in a Digital Marketing Perspective: the case of ByteDance

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GENERAL OVERVIEW

The main purpose of this written thesis is to analyze the fascinating and continuously developing world of the artificial intelligence and the machine learning in the prospective of concrete application to the marketing context. Personalized feeds, fast reachability of the contents, addiction on the customer experience are only a minimal part of potentialities of the application of the new paradigm of artificial intelligence. The historical experiences of artificial intelligence and machine learning helped to develop new technologies for society, and new application on the daily life. In this manner, also businesses found applications with this new technology. Marketing is not an exception, with new tools and strategies to be adopted to be more efficient and effective. For this reason, this work will face modern strategies for digital marketing taking into account the new paradigm of consumer behavior and sensible data management from companies. To better understand the real capabilities and limitations to the usage of this new technology, it will be taken in analysis the successful business case of ByteDance, the Chinese company owner of the popular application of TikTok/ Douyin as example of interesting application of customizable user experience and valuable tool for marketers and people involved in the business world.

Artificial intelligence and machine learning are creating new cognitive tools that enhance our ability to think at scale and that capacity will produce rewards for every person on the planet.

Vint Cerf, Chief Internet Evangelist Google, one of the Fathers of the Internet

CHAPTER 1

AI, MACHINE LEARNING AND DEEP LEARNING: HISTORIC PATHS, CLASSIFICATIONS AND APPLICATIONS

1.1 INTRODUCTION

When we refer to artificial intelligence, we immediately associate the idea of the whole set of schemes regarding human thinking and computations applied to every sort of robotic machines. Basically, artificial intelligence is meant as the trial to recreate the human intelligence into machines through algorithms [1], which can vary from simple to very a complex structure. The results are astonishing: machines begin to be able to think in a very similar way to the human mind and in some cases overperforming it, creating unique frameworks based on problem-solving and learning as humans do. For this reason, the AI concept should be seen in a nuanced view and not as a unique block of computational skills. As a consequence, the concept of AI is not that clearly easy to define for three main reasons: firstly, as the human intelligence is quite tough to define, consequently a concept of artificial intelligence may be abstract to be described. For the second instance, the so-called "AI effect" may emerge: when the AI solves a problem, the problem is no longer

[1] It is defined as algorithm the process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.

perceived as a result of the artificial intelligence. As written by P. McCorduck "Practical AI successes, computational programs that actually achieved intelligent behavior, were soon assimilated into whatever application domain they were found to be useful and became silent partners alongside other problem-solving approaches, which left AI researchers to deal only with failures, the tough nuts that couldn't yet be cracked. […] If you could see how it was done, people seemed to think, then it couldn't be intelligence." [2] The AI effect is also referred to an "odd paradox" for which all the developments made by the artificial intelligence are considered habitual and familiar to people and consequently, they are no longer perceived as AI. Lastly, as a third reason, the concept of AI is translated into a variety of different types of application, stages and sorts so that implies the difficulties to explain a single and unique definition always valid.

However, many definitions were made in order to try to better explain this phenomenon. In a general perspective, Kaplan & Haenlein (2019) described it as "a system's ability to interpret external data correctly to learn from such data and to use these learnings to achieve specific goals and tasks through flexible adaptation." [3]. In a more specific way, another definition was given by Nilsson: "Artificial intelligence is that activity devoted to making machines intelligent, and

[2] McCorduck, P. (1979), Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence. pg 204; 423

[3] Kaplan & Haenlein (2019), Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence pg. 1

intelligence is that quality that enables an entity to function appropriately and with foresight in its environment."[4] (Nilsson, 2010).

The real birth of the AI has root in the Dartmouth Conference held in 1956 by professor John McCarthy and participated by Marvin Minsky, Allen Newell, Claude Shannon, Nathan Rochester, Arthur Samuel and others. The main study of the conference was "to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves."[5]. Basically, the summit tried to brainstorm discussions about automatic calculators, machine languages, neuron networks, theory of computation, abstractions, randomness and creativity with the aim of simulating human intelligence. Moreover, the term Artificial Intelligence was coined at this conference for the first time in the history. Furthermore, in these years the concept "Machine Learning" started to be a fundamental part of the game in artificial intelligence as mentioned by Arthur

[4] Nils J. Nilsson (2010) The Quest for Artificial Intelligence: A History of Ideas and Achievements. pg. 13
[5] McCarthy, John; Minsky, Marvin; Rochester, Nathan; Shannon, Claude (1955), A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence

Samuel: it is based on “programming computers to play a game of chess better than the human who wrote its program” [6].

Therefore, it was in 1956 when the study of AI obtained the status of a real scientific discipline, but the first theories in which the concept of "thinking machine" can be discerned are actually of much precedent. Among the very first works in this area, it is noteworthy the one made by Warren McCulloch and Walter Pitts in 1943 in which they proposed an artificial neural network (ANN) model [7] inspired by the functioning of the human brain. Not only they formally demonstrated that the rules of Boolean logic could be implemented in their model, but they also speculated that this system was able to "learn" (this was demonstrated by Donald Hebb in 1949 by making some changes to the previous model)[8].

In this sense, 1951 was the year when Dean Edmonds and Marvin Lee Minsky developed a connectionist neural net machine called SNARC (Stochastic Neural Analog Reinforcement Calculator), able to perform a mechanism only when there was a success previous task (Hebbian Learning) [9]. This attempt was a very primitive approach to what I would be done years after with the development of machine learning and deep learning. In this regard, these are also the years of the

[6]Samuel Arthur L. (1959), Some Studies in Machine Learning Using the Game of Checkers Published in IBM Journal, Vol. 3, No.3. July 1959
[7] McCulloch, Warren; Walter Pitts (1943). "A Logical Calculus of Ideas Immanent in Nervous Activity". Bulletin of Mathematical Biophysics.
[8] Hebb, Donald (1949). The Organization of Behavior. New York: Wiley.
[9] Crevier, Daniel (1993), AI: The Tumultuous Search for Artificial Intelligence. pg. 34

publication of some papers of Alan Turing that opened and supported the era of the artificial intelligence. From his studies, he was able to theorize in mathematical terms the concept of "Turing Machine": it is the first abstract model of modern calculator machine capable to compute algorithms and endowed of unlimited potential tape on which it can read and/or symbols. Furthermore, his studies were not limited only to this theoretical model. "Can machines think?" was the critical question at the base of the future method of evaluation of machines named Turing Test[10]. Indeed, Turing through this approach was able to define a criterion for which it is possible to determine if the machine is endowed by an intelligent behavior equal and/or indistinguishable from the human one.

This Turing's idea was so futuristic that only two decades after, the Turing test found a practical application to a famous computer program named ELIZA, a precursor of the actual chatterbots based on natural language processing structure.[11] The program was able to create a simulation of conversation between a psychotherapist (Eliza) and a patient using rules from a written script (simple pattern matching and substitution rules).

After this first flourishing and profitable period of developing in AI fields, seventies were characterized by a dramatic decrease in investments in matter of

[10] Alan Turing (1950), "Computing Machinery and Intelligence," Mind, LIX/236: pgg. 433-460
[11] Weizenbaum, Joseph (1976). Computer Power and Human Reason: From Judgment to Calculation. pgg. 2-6

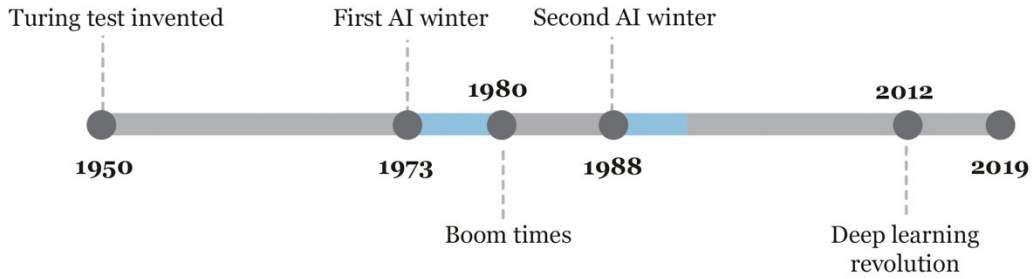
innovation due to some triggering reports about AI such as the "Automatic Language Processing Advisory Committee" (ALPAC) by US government (National Academy of Sciences, National Research Council, 1966) and "Artificial intelligence: a general survey" (Sir Lighthill, 1973). In this sense, the ALPAC was made with the purpose of an economic investment instead of research motivations for the development of machine translation against the Russian government that led to disappointing results[12]. Meanwhile, overseas, the British professor of Cambridge University James Lighthill, with his survey (Lighthill Report) in 1973, discouraged the British government to continue to invest in AI fields stating a weak application of AI in real-life problems.[13]

This gloomy period was considered and then called "AI Winter", a period characterized by cuttings in investments and low optimism by researchers. Even though the decrease in investments lasted for a decade, the field of AI experienced a new peak in eighties. Generally, the technological industry faced an increase in interest so that many innovative products were produced and commercialized. New technologies spread out in companies such as "Expert systems" as support in financial problem-solving, opening the doors to a new prosperous period for ai. However, researchers feared an upcoming return of a second winter for AI after this

[12] Hutchins, John. (1996). ALPAC: the (in)famous report, Jun MT news International 14, 9-12.
[13] Sir Lighthill, James. (1973). Artificial Intelligence: A General Survey, Artificial Intelligence: A paper symposium, Science Research Council. He refers on this article "in no part of the field have discoveries made so far produced the major impact that was then promised"

unexpected innovative boom. Indeed, no sooner said than done, in the next years, AI suffered a financial slowdown around the world due to unreachable practical goals pre-fixed: the second AI winter. Even Japan government that massively invested for AI projects such as "Fifth Generation Computer System"[14], experienced disappointing results in 90s from expectations made in 80s, after invested 850$ million in the project.[15]

Figure 1: MILESTONES OF ARTIFICIAL INTELLIGENCE



[Source: History of the first AI Winter, S. Schuchmann]

Throughout the course of 90s and the new millennium, old challenges found the concreteness in real applications and new ones came out. Subsequent the period of break of the second winter of AI, a new round of exploration and investments begun in the first years of 90s, a period characterized by successful applications in

[14] McCorduck (1979), Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence pp. 436–441
[15] The New York Times (1992), Fifth Generation' Became Japan's Lost Generation

the technology industry by a burst in high technology investments and machine learning that promoted a potential economic effect that is lasting nowadays. In 1995, Richard Wallace created ALICE (Artificial Linguistic Internet Computer Entity) strongly inspired by ELIZA but with improvements on a more natural sample data collection. Two years later in 1997, IBM's chess-playing computer Deep Blue won against the world chess champion Garry Kasparov becoming the first elaborator system to beat a person with a very high skilled background. Moreover, this year were developed and improved neural networks with machine learning capability such as RNN and LSTM architectures (respectively Recurrent Neural Network and Long Short-Term Memory) responsible for speech and handwriting recognition algorithms, still largely used by large companies nowadays (Apple with quick-type feature and Siri, Amazon with voice recognition for Alexa, Google with Google Assistant or speech-to-text technologies). Virtual assistants are now able to replicate and mimic a human voice with tone of voice, interact with human and even schedule a hair salon appointment.[16] And again, smart home devices (domotica) are able to create an automatic routine based on the previous and specific behavior with the service If This Then That (IFTTT technology) [17] or more, based on what it could be suitable for people since its taste or prevision. In

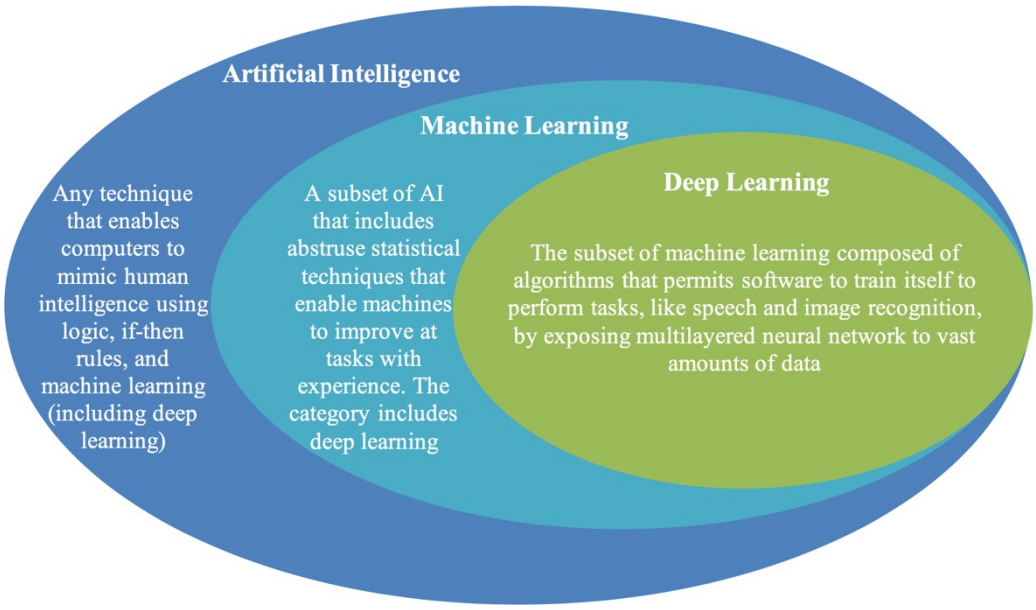
[16] Google I/O (2018), Google Duplex: An AI System for Accomplishing Real-World Tasks Over the Phone

[17] Xianghang & Qian, Feng & Zhang, Ying & Wang, Xiaofeng. (2017), An empirical characterization of IFTTT: ecosystem, usage, and performance. 398-404.

few words, electronic devices started to have a certain self-machine learning with the human aid or not since the development of the sophisticated learning algorithms continuously powered by big and aggregate data retrieved from the usage of consumers. In this sense, the XXI century experienced a valid and concrete spreading of the so called "deep learning" that is defined as "an approach to AI. Specifically, it is a type of machine learning, a technique that allows computer systems to improve with experience and data. […] is a particular kind of machine learning that achieves great power and flexibility by learning to represent the world as a nested hierarchy of concepts, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones."[18]. In an increasingly digitalized and borderless world, the augmented amount of elaborated data (Big Data) allowed not only an easier development of machine learning but also a more precise and accurate execution of a task. Next decades will be characterized by new challenges and opportunities, to better enhance and boost skills and applications of AI: internet of things, robotics, automation, big data analytics are the key words for our century.

[18] Ian Goodfellow, Yoshua Bengio, Aaron Courville (2016), Deep Learning pg. 8, The MIT Press, Cambridge Massachuttes, London England

Figure 2: VENN DIAGRAM OF SUBSETS OF AI, ML AND DL



[Source: Retrieved from IBM.com IT INFRASTRUCTURE (2019)]

1.2 CLASSIFICATIONS OF ARTIFICIAL INTELLIGENCE

Going forward into a deeper analysis, artificial intelligence may be seen from different aspects, as the result of the particular nature of the matter. Different approaches follow different way to frame the AI.

First of all, understanding the learning algorithm process that are at the base of AI and ML will better clarify the mechanism behind it and the main categories of skills of intelligence; these learning processes could be generally identified in three main approaches: Supervised Learning, Unsupervised Learning and Reinforcement Learning. They each differ for the input, output and the task they are programmed to perform. In Supervised Learning "the learner receives a set of labelled examples as training data and makes predictions for all unseen points. This is the most common scenario associated with classification, regression, and ranking problems. Spam detection on email is an instance of supervised learning" [19]. This type of learning permits machines, from large database, to label and categorize images distinguishing object that are similar but different (an apple from a pear in the same picture). Unsupervised Learning, on a different way, is the condition when "the learner exclusively receives unlabeled training data and makes predictions for all unseen points. Since in general no labelled example is available in that setting, it can be difficult to quantitatively evaluate the

[19] Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar (2012) Foundations of Machine Learning, The MIT Press, pg. 6

performance of a learner. Clustering and dimensionality reduction are example of unsupervised learning problems.". Finally, Reinforcement Learning is when "the learner actively interacts with the environment and in some cases affects the environment and receives an immediate reward for each action. The object of the learner is to maximize his reward over a course of actions and iterations with the environment. However, no long-term reward feedback is provided by the environment, and the learner is faced with the exploration versus exploitation dilemma, since he must choose between exploring unknown actions to gain more information versus exploiting the information already collected." [20].

Whilst, with regards of the skills of the intelligence, we can refer to three types of competence of the general intelligence: cognitive intelligence (linked to the structure of the way of thinking), emotional intelligence (self-awareness) and social intelligence (all the patterns related to the teamwork, social networks)[21]. These types of human intelligence can be framed into types if AI systems that it will be discussed in the following paragraphs.

Mainly, coming back to the focus of the artificial intelligence classification, it could be possible to classify the artificial intelligence by certain criteria: by stages considering the grade of level of intelligence of a machine taking as point of

[20] Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar (2012) Foundations of Machine Learning, The MIT Press, pg. 7

[21] Bass, B. M. (2002). Cognitive, social, and emotional intelligence of transformational leaders. In R. E. Riggio, S. E. Murphy, & F. J. Pirozzolo (Eds.), LEA's organization and management series. Multiple intelligences and leadership (p. 105–118). Lawrence Erlbaum Associates Publishers.

reference the human intelligence or by competencies considering the macro-area where the intelligence is successful.

1.2.1 STAGES: ANI, AGI, ASI

Starting the analysis considering the stages, it is possible to identify three stages of AI that are narrow, general and super intelligence.

Artificial Narrow Intelligence (ANI), also known as 'weak AI', is compiled to perform a single task by extracting information from a dataset using a pre-fixed range of information. Some examples include the task of checking the weather, playing chess, and analyzing raw data to write articles that are embedded in products like Siri, Alexa and Google Assistant. They are classified as ANI as they are not conscious machines, indeed they lack the self-awareness, consciousness and genuine intelligence to match human intelligence. The term 'weak AI' does not have the fluidity nor flexibility to think like us. Even self-driving cars would be classified as weak AI, even though they consist of multiple ANI systems.

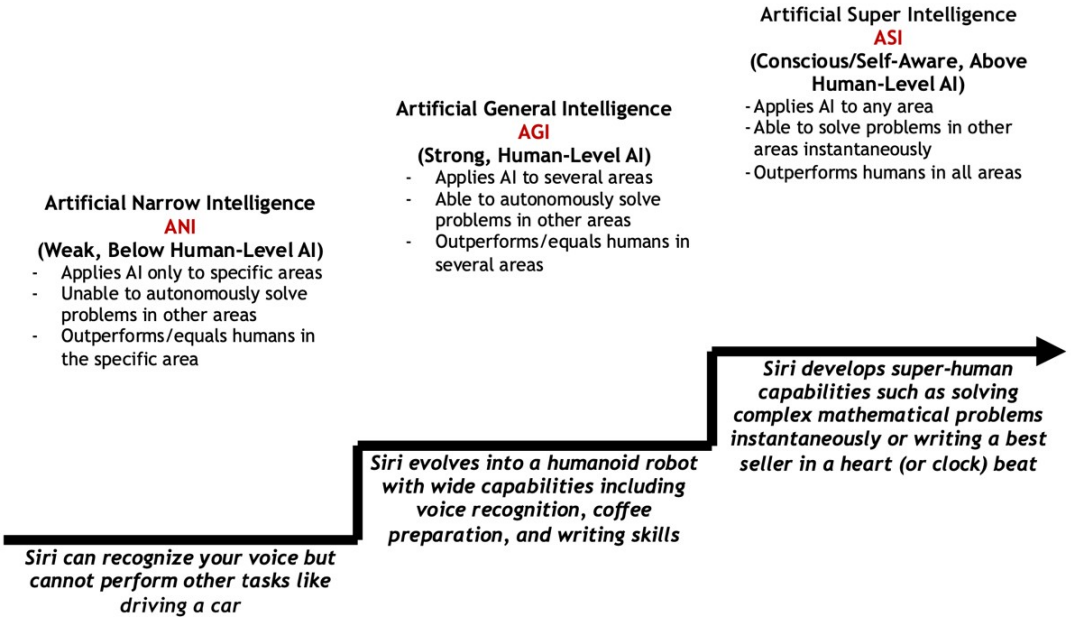
Next, Artificial General intelligence (AGI) or 'strong AI' or sometimes "Deep AI" refers to machines that exhibit and mimic human intelligence, i.e. the machine's intellectual capability and/or behavior is functionally equal to that of a

human. An example is the Fujitsu K supercomputer that took 40 minutes to simulate a single second of neural activity[22]

Artificial Super Intelligence (ASI), is when AI surpasses human intelligence and/or behavior. It is defined by Nick Bostrom, Oxford philosopher as "any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest". Tech titans Elon Musk (Tesla) and Mark Zuckerberg (Facebook) agree on the fact that in the future, ASI could be dangerous for the entire humanity.[23] Musk has claimed regarding the adoption of these technologies as autonomous weapons that "these can be weapons of terror, once this Pandora's box is opened, it will be hard to close". [24]

[22] Hornyak, T. (2013). Fujitsu supercomputer simulates 1 second of brain activity. Retrieved from Cnet: https://www.cnet.com/news/fujitsu-supercomputer-simulates-1-second-of-brain-activity/
[23] Smith, R. (2018, April 19). 5 core principles to keep AI ethical. Retrieved from World Economic Forum: https://www.weforum.org/agenda/2018/04/keep-calm-and-make-ai-ethical/
[24] Revesz, R. (2017). Elon Musk says AI poses bigger threat than North Korea and could trigger World War Three. Retrieved from Independent: https://www.independent.co.uk/news/science/elon-musk-north-korea-ai-world-war-three-a7929661.html

Figure 3: AI STEPS BY STAGES



[Source: Kaplan, Haenlein (2019)]

1.2.2 COMPETENCIES

Following the stream of classification, the management literature identified three distinct types of AI system that based on competencies with respect of the types of intelligence adopted in the system: Analytical AI, Human-inspired AI, Humanized AI (Kaplan & Haenlein, 2019). It has been taken into account as point of reference to categorize AI at the left extreme "Expert Systems" that revealed limits on their applications as said before and, on the other side, "Human Being" which fully covered the areas object of the examination as depicted in table 1.

Concerning the first one, Analytical Artificial Intelligence refers only to characteristics of cognitive intelligence which it is translated to the use (so that learning) of previous data from the past for future decision. This intelligence is used for systems of banking bank, financial services, and automation of machines.

Afterwards, Human Inspired AI comprises features of cognitive and emotional intelligence meantime. Basically, the improvements with respect of the previous one is that the intelligence can understand human emotions.

Lastly, Humanized AI mimics and reproduces cognitive, emotional, social intelligence; at the end, artist creativity seems to be an exclusivity of the human beings, something that, to the present days, it is not replicable by machines.[25]

[25] R Keith Sawyer (2014) Explaining Creativity: The Science of Human Innovation. Oxford University Press.

Table 1: TYPES OF AI SYSTEMS

	Expert Systems	Analytical AI	Human-Inspired AI	Humanized AI	Human Beings
Cognitive Intelligence	×	✓	✓	✓	✓
Emotional Intelligence	×	×	✓	✓	✓
Social Intelligence	×	×	×	✓	✓
Artistic Creativity	×	×	×	×	✓
		Supervised Learning, Unsupervised Learning, Reinforcement Learning			

[Source: Kaplan, Haenlein (2019)]

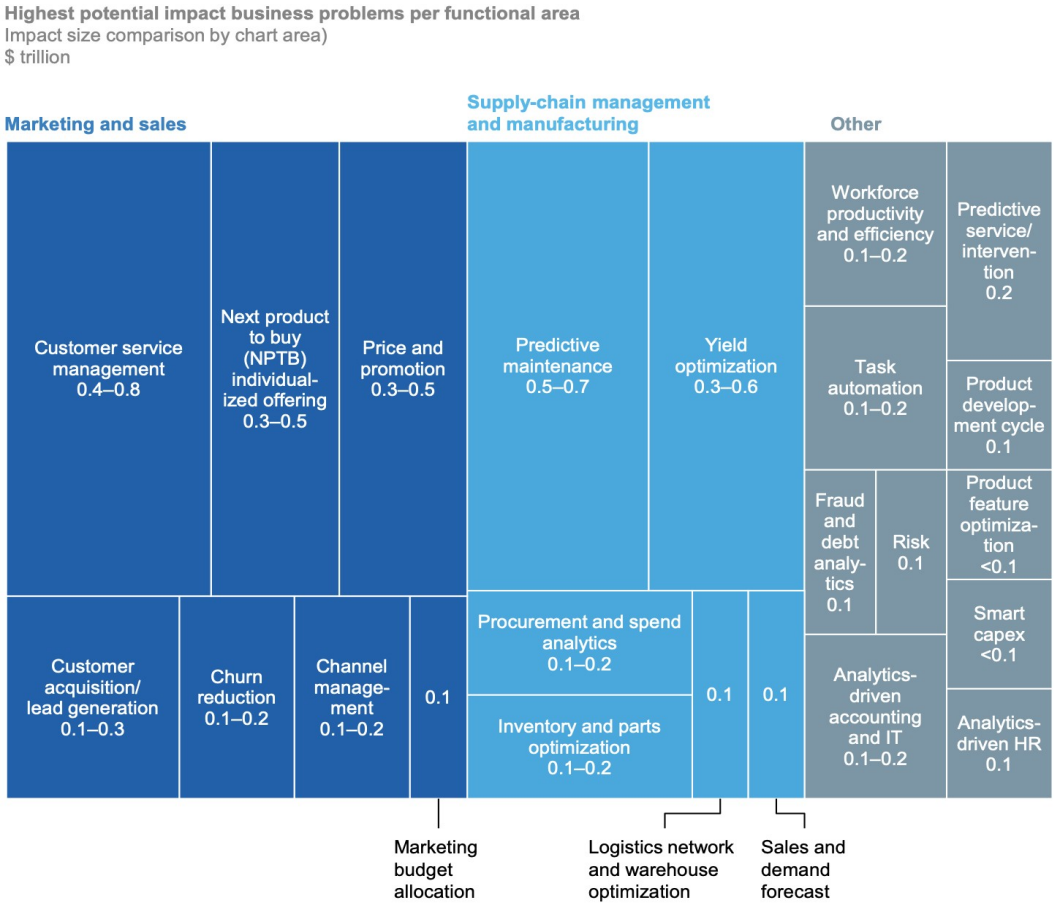
1.3 POTENTIAL APPLICATION OF AI ON INDUTRIES AND LABORFORCE

Nowadays, the spreading of this new paradigm of machine learning is powered by the collection of huge amount data and analytics and automation will find a crucial role in boosting performance and productivity. According to HBR's estimation, the world's business might create value for $1.2-$2 trillion in supply chain management and manufacturing and $1.4-$2.6 trillion of value in marketing and sales and benefits to the overall global economy from $3.5 trillion to $5.8 trillion in annual value. [26]. Another study of McKinsey Global Institute confirmed

[26] Michael Chui, Nicolaus Henke, Mehdi Miremadi (2018), Most of AI's Business Uses Will Be in Two Areas, Harvard Business Review. Retrieved from: https://hbr.org/2018/07/most-of-ais-business-uses-will-be-in-two-areas

an incredible value opportunity from the adoption of AI, assigning to the Marketing and Sales sector the primacy for the biggest value opportunities.[27]

Figure 4: AI POTENTIAL IMPACT IN MARKETING AND SALES – SUPPLY CHAIN-MANUFACTURING SECTOR PER FUCTIONAL AREA



[Source: McKinsey Global Institute]

[27] Mckinsey&Company (2018), Notes from the AI frontier, insight from hundreds of use cases, Mckinsey Global Institute

Moreover, global economy will face a new challenge in the future, the one based on a coexistence of machine and human approach to the work. Even though there is the general thinking of machine in substitution of human job position, a collaborative solution is considered more appropriated, the so-called "collaborative intelligence". This new approach to the business is the result of the advent of artificial intelligence and companies do experience higher performance gains when humans and machines collaborate together. It has been studied that collaboration between humans and artificial intelligence create synergies, filling up lacks in both fields: what is natural for humans can be tough for machines, what is easy and immediate for machine is difficult for humans. Machines require the training by workers to be active, understanding their outputs and their correct application. On the other hand, human's skills and capabilities can be improved by machines with complex algorithms. In a study conducted, over 1500 companies experienced significant performance improvement when humans and machines join forces creating an efficient workforce.[28]

This is the reason why more and more companies are introducing artificial intelligence into their businesses, to better optimize and make efficient the production process, enabling fast and large scale of decisions in less time. Example

[28] H. James Wilson and Paul R. Daugherty (2019), Collaborative Intelligence: Humans and AI Are Joining Forces, On AI, Analytics, and the New Machine Age, Harvard Business Review pgg 127-128

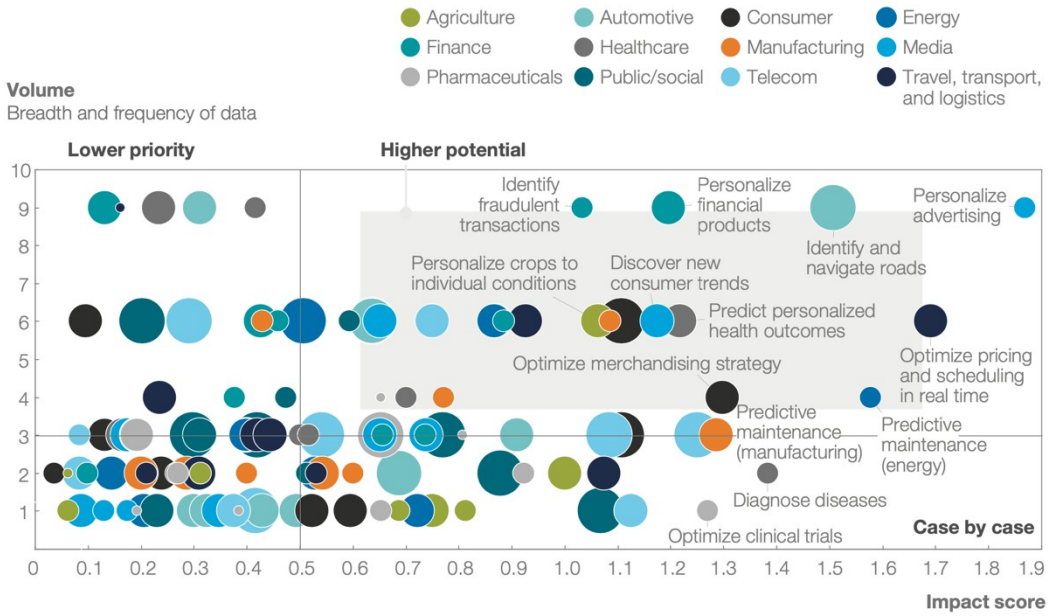
of improvements in performance are the possibility to detect anomalies in production boosting the maintenance in advance, cost-reduction for logistic through forecast or customization and tailored customer service management with the use of speech-recognition of the emotional tone of a compliant customer call.[29].

In a marketing and sales perspective, analytics and cross data analysis allows to combine online customer purchases with demographic data to forecast what it could be suitable for you ("if you liked this product, you might like this product", a recommendation system successfully and already adopted by Netflix or Amazon that could increase the rate of sales conversion.[30]

[29] Michael Chui, James Manyika, Mehdi Miremadi, Nicolaus Henke, Rita Chung, Pieter Nel, and Sankalp Malhotra (2018), Notes from the AI frontier: Applications and value of deep learning, McKinsey Global Institute

[30] MarTech Advisor (2016), Recommendation Engines: How Amazon and Netflix Are Winning the Personalization Battle

Figure 5: MACHINE LEARNING POTENTIAL BY INDUSTRY SECTORS



[Source: Mckinsey&Company, Mckinsey Global Institute (2017)]

1.4 AI WAVES

The revolutionary process for the adoption of AI tools in the business might take some time, especially if we consider the nuances of opportunities that AI had and can deliver to a business. Just reflects on the adoption of deep device learning that has had a revolutionary impact on customers and also from the company point of view thanks to data collections and analytics. In this regard, Kai-Fu Lee's AI

Superpowers created a framework [31] to examine AI capabilities, clustering them in four classes that have spread out over time:

- **Wave 1** - Internet AI: started in 1995 but became mainstream around 2012, it was powered through the massive amount of data flowing via the web. Internet AI leverages the fact that users automatically "label" statistics as they surf on websites (buying vs. not buying, clicking vs. not clicking). This behavior leads to the creation of labelled statistics that were collected, and it built an in-depth profile of user's personalities, habits, and desire; a perfect recipe for tailored content to keep them on a given platform and therefore maximize its sales or profits. It is the suggestions mechanism mentioned before in the previous paragraph, the "recommendations engine", able to understand your personal taste and preferences and provide to the final user a suitable content. Pioneers of this wave has been eleven American "big tech" companies like Google, YouTube (before the acquisition of Google), Amazon or Facebook, while Chinese companies like Alibaba, Toutiao or Baidu has embraced it later.
- **Wave 2** - Business AI: the second wave is based on data correlation and analytics that at first sight are hidden to the human eye or brain. By

[31] Kai-Fu Lee (2018), AI Superpowers: China, Silicon Valley, and the New World Order, Houghton Mifflin Harcourt pgg. 109-113

recognizing hidden correlations that get away linear cause-and-effect, AI companies can outperform a (human) expert. This wave really and concretely exploits the potentiality of deep learning, forecasting a behavior and so an appropriate decision-making for managers. For instance, in banking-finance fields, it is possible to understand the type of borrower is riskier or not by analyzing thousands of bank loans and repayment rates. Leaders in this wave are US companies that took advantages with the first wave collecting aggregate data and implementing them into their businesses.

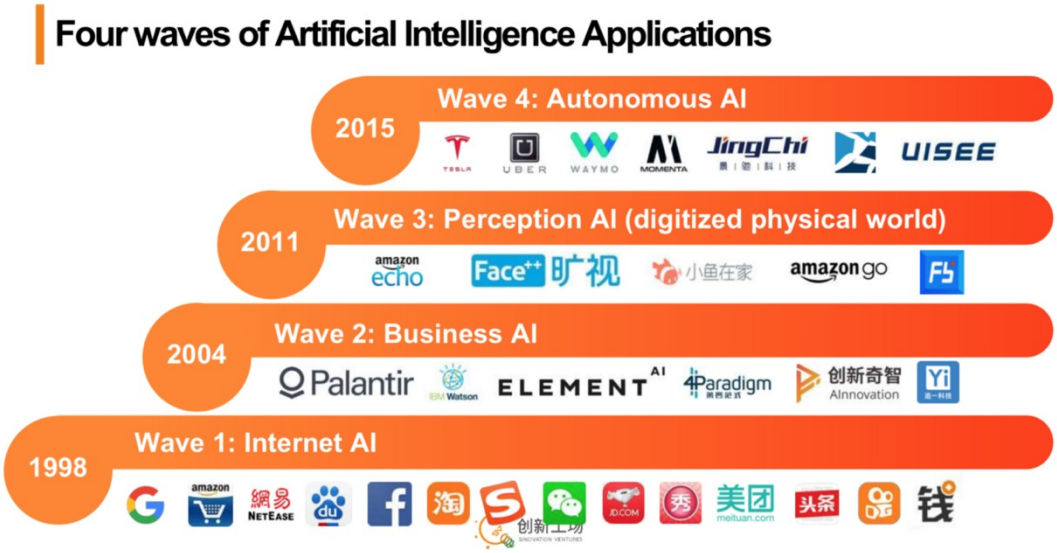
§ **Wave 3** – The third wave is the so-called Perception AI that enhances the experience in a multisensorial approach involving ears, eyes to create an integrated digitalized reality. To this purpose, smart devices are helping this environment digitalization in everyday life outside and indoor: voice assistants as Amazon Echo or Google Assistant are step by step integrated sustaining daily simple tasks, face and voice recognition systems by Apple Pay or Samsung Pay are used to authenticate banking credential access or to allow credit cards payments at the supermarket. As a result, this wave creates a blurred line between the online and the offline world creating an OMO environment (online-merge-offline) but also an insidious problem of personal data treatments.

§ **Wave 4** – Consequently to the successful approach of the Perception AI, the last step to the ultimate wave is the Autonomous AI, as powerful as still difficult to applicate. As a result of the all previous AI waves, machines at this point are self-sustained AI able to understand the environment they are into and capable to adapt themselves to the need of the moment, as humans do. The more noticeable example is the driverless car of Tesla and google that can understand the surrounding and adapt the speed or in case of emergency stop the drive.[32]

Even though we have experienced the first and second wave, that changed and are changing our behavior in the daily routine, surely it will require more time and investments the achievement of a complete ai revolution.

[32] Ni, Jianjun & Chen, Yinan & Chen, Yan & Zhu, Jinxiu & Ali, Deena & Cao, Weidong. (2020). A Survey on Theories and Applications for Self-Driving Cars Based on Deep Learning Methods. Applied Sciences.

Figure 6: FOUR WAVES OF ARTIFICIAL INTELLIGENCE APPLICATION



[Source: AI Superpowers: China, Silicon Valley, and the New World Order]

CHAPTER 2

AI AND MACHINE LEARNING IN A MARKETING CONTEXT

2.1 INTRODUCTION

As mentioned before, artificial intelligence can bring incredible value to the company when integrated to the business. In particular, when integrated into a marketing prospective, it offers efficient tool in customer relationship management, enhanced lead generation and retargeting, optimized advertising, chatbots and a lot of more. If nowadays is it perceived as something that is nice-to-have, in a foreseeable future it would be an have-to-have to the marketing experience. It has been shown from a Gartner Survey in 2019 that the 37% of organizations has already implemented AI tools in some form in their business, a rate that grown of over 270% over the past four years [33], witnessing the powerful application of AI tools. The advantage is that it allows businesses to build the capacity to handle big amount of data and extract relevant output to optimize sales process and make smart the customer experience. The artificial intelligence, and so the machine learning, do not want to substitute the human vision and knowledge in matter of qualitive

[33] Gartner Inc. (2019). 2019 Gartner CIO Agenda Survey. Orlando: Gartner Inc.

metrics and data focusing; it is more consonant to talk of AI and ML integration into the business since it is still too early to completely substitute and automate some types of human tasks. Indeed, only the synergy between analytics and contextualization of those data can create concrete business opportunities.

Mainly, AI can find application in a marketing context in at least four main areas that is translated to a competitive advantage for the business:

1. Forecasting customer's needs: through insights and analytics, it is possible to precisely understand in time people interests and needs, providing, as a consequence, better products or service with higher quality. In some cases, AI platforms can adopt an optimized and flexible pricing to be always competitive in the market. This will be translated to a better customer satisfaction. For example, Spotify uses artificial intelligence to create the "Discover Weekly" playlist based on customer's habits and taste.[34] Another example of application is KFC China that exploit the facial recognition algorithm with Baidu collaboration to forecast the customer order.[35]
2. Task automation: machine learning allows marketers to automate repetitive task, improving them with hidden insights elaborated by algorithms such as

[34] Ciocca, S. (2017). How Does Spotify Know You So Well? Retrieved from Medium https://medium.com/s/story/spotifys-discover-weekly-how-machine-learning-finds-your-new-music-19a41ab76efe

[35] Hawkins, A. (2017). KFC China is using facial recognition tech to serve customers. Retrieved from The Guardian: https://www.theguardian.com/technology/2017/jan/11/china-beijing-first-smart-restaurant-kfc-facial-recognition

discover the most loyal customer to the company, the one with the highest value of spending and so on. Moreover, customers can benefit this automation inside a products or service, just think on the automatic recognition labelling of Google Photo[36] or the use of chatbots to order Domino's pizza.[37]

3. Accurate marketing campaign optimization allows marketers to keep on track and measure the impact of marketing activities real-time, creating the possibility to adjust or reassess. Furthermore, it grants the opportunity to stay connected to the right audience through a multichannel approach. An example of this application is the powerful AI tools that track and records visits and actions of a visitor on a website and translate this behavior in analytics useful to create tailored ADs or content.[38]
4. Process Monitoring: offers to marketers a solid dataset of analytics and KPI that can improve people productivity, looking inside and outside of the firm.

[36] Byford, S. (2019). How AI is changing photography. Retrieved from The Verge: https://www.theverge.com/2019/1/31/18203363/ai-artificial-intelligence-photography-google-photos-apple-huawei

[37] Business Insider Intelligence. (2016). You can now order Domino's pizza through a chatbot on Facebook Messenger. Retrieved from Business Insider: https://www.businessinsider.com/you-can-now-order-dominos-pizza-through-a-chatbot-on-facebook-messenger-2016-9?IR=T

[38] Morris, D. Z. (2020). How marketers are increasingly using A.I. to persuade you to buy. Retrieved from Fortune: https://fortune.com/2020/01/31/ai-marketing-persuade/

Monitoring and tracking interactions and processes allows to have a picture of the situation, preventing critic unexpected events.[39]

All of these mechanisms are translated to a concrete improving of customer experience (CX) that will be led by AI in a next future. According to Forbes, 95% of customer interactions will be supported by AI technologies including chatbots, customization tools and automation.[40]

To ensure a successful application of the AI into the customer experience, Trapica Team for Forbes, identified three steps [41], three blocks of capabilities that ensure the integration:

1. Data Unification: the creation of a single and unique customer view is crucial since avoid problems of wasting time and useless elaboration. With a unique dataset, the segmentation and the analytics works more efficiently, delivery a precise and aligned profile of the customer.
2. Delivery of Real-time Insight: the more it is possible to have real-time insight about the customer experience, the better the quick response to an issue in the customer touchpoint could be plausible.

[39] Eckerson, W. (2018). Beyond the Dashboard: How AI Changes the Way We Measure Business. Retrieved from: https://www.eckerson.com/articles/beyond-the-dashboard-how-ai-changes-the-way-we-measure-business

[40] Morgan, B. (2018). 10 Customer Experience Implementations of Artificial Intelligence. Retrieved from Forbes: https://www.forbes.com/sites/blakemorgan/2018/02/08/10-customer-experience-implementations-of-artificial-intelligence/#3738a7302721

[41] Trapica (2019). The Role of AI Marketing in Customer Experience. Retrieved from Medium: https://medium.com/trapica/the-role-of-ai-marketing-in-customer-experience-218e653ae2d6

3. Business Context: since every customer journey is unique, also business it is. AI integration is not meant to completely transform your business without contextualization but help to shape it, according to a specific customer behavior.

2.2 RACE FRAMEWORK AS MODEL FOR THE CUSTOMER JOURNEY

To better understand in which ways AI is integrated into the cx journey, it has been borrowed the (P)RACE Framework by SmartInsights team that depicts the relevant steps of the customer experience. The RACE Framework is an evolution of the REAN model, developed by Xavier Blanc in 2006 and published in 2009 by Steve Jackson with the purpose of delineate the online digital strategy modelling. REAN framework was based on measuring the business outcomes and reviewing them with relevant KPIs by mapping digital marketing activities. [42] It is composed by four stages (Reach-Engage-Activate-Nurture):

R Reach: all the required activities to increase and improve the awareness of your product, service and brand.

E Engage: all the essential activities to engage customers, usually in a multi-channel approach

[42] Jackson, S. (2015). Cult of Analytics - Data Analytics for Marketing, 2nd Edition. Oxford: Butterworth-Heinemann. pgg 22-25

A Activate: all the pre-defined activities that push customers to act on what you decided.

N Nurture: the set of activities required to grow a constant and repetitive customer relationship in the long run.

This model was perfectionated and improved by Dave Chaffey of SmartInsights to provide a simpler but efficient development of the digital marketing strategy under the name of RACE. This new model now associates a specific smart Key Performance Indicator (KPI) for each stage, useful to keep on track the performance of the strategy and to manage and review the content strategy effectiveness.[43] Over the four phases that follows the typical customer journey, it comprises an initial phase (Plan) concerning the strategies of content creation for digital channels: reviewing marketplace and setting objectives, creating a digital strategy and implementation and management of digital marketing communications. As a premise, it is essential to remind that the framework not necessarily evolves in a linear way, since nowadays the customer approach to the purchase is based on a seamless omni-channel experience, breaking the rigid structure of the traditional funnel.[44] The model is structured in four stages as follow:

[43] Chaffey, D. (2017). Introducing RACE: a practical framework to improve your digital marketing. Retrieved from Smart Insights: https://www.smartinsights.com/digital-marketing-strategy/race-a-practical-framework-to-improve-your-digital-marketing/

[44] Philip Kotler, H. K. (2016). Marketing 4.0: Moving from Traditional to Digital. John Wiley & Sons.

R Reach: this step is meant to increase brand awareness and drive site visits using continuous inbound marketing. The buyer is at the exploration phase. At this stage is essential to define the online audience potential, outlining a realistic target in terms of social media followers/like or website traffic we want to reach and select the most suitable communication for the audience with the use of relevant media, all coherent with the content marketing strategy. It could be useful to create a sort of hub or network in order to enhance the promotion and the sharing of your content with the aid of social media, content and email marketing. The KPIs for this stage are for example:

- n° unique visitors and fans
- audience shares
- revenue/goal value per visit
- brand search volume and share of conversation

A Act: it is the abbreviation of interact, it defines the customer journeys to connect website visitors with relevant content to generate leads. The buyer is at the decision-making stage. At this point, it is needed to identify best options to increase the lead conversion, using analytics, measuring customer interactions and reviewing SM and mobile marketing platform engagement. The strategy at this point is to give priority to content marketing plan and to

the definition of the buyer personas through also the creation of marketing campaign plan and an editorial calendar plan. With a specific regard to mobile platform, an optimized and efficient landing page will enhance this process of encouragement brand interaction and lead generation. The KPIs for this stage are for example:

- Bounce Rate
- Pages per visit
- Lead Conversion Rate
- Time on site or platform (when measurable)
- Likes/Comments/Shares

C Convert: it is aimed to convert the lead to sale online (or offline) using reminders and persuasion. The buyer is at the purchase stage. Now, at this point, it is important to define an approach for online conversion rate optimization (CRO), investing on improvements for marketing automation, efficient remarketing and optimization of ROPO (research online, purchase offline). Moreover, the CRO implementation could be integrated to a test plan for A/B versions in order to find the most profitable result.

The KPIs for this stage are for example:

- Sales (On-line and Off-line)
- Revenue/Profit

- Average Order Value
- Conversion Rate to Sale

E Engage: it is based on the customer communications to encourage advocacy and repeat sales. The buyer is at the stage of Advocacy. This is the last step based on the building of the customer loyalty and advocacy in the long-term, improving the customer engagement as much as possible and creating a solid referral network. The strategy for this step is to define a customer engagement plan for the long-term considering the customer satisfaction and taking into account the RFM analysis (Recency – Frequency – Monetary) for sales. The KPIs for this stage are for example:

- % Active Customers
- Customer Satisfaction Ratings
- Customer Advocacy
- Repeat Conversion Rate

Finally, to manage and to keep on track and review the content marketing effectiveness, the same author of the framework identified key performance indicator for each stage by level of analysis, coherent with the digital strategy

adopted[45]; KPIs are categorized in a dashboard by metrics for tracking, performance driver indicators, customer-based indicators and business value key performance indicators (Table 2).

It is evident that the integration of KPIs in the digital strategy it is essential for the monitoring and reviewing of the pre-fixed goal in the overall marketing strategy. In the following section, it will be analyzed the integrated tools of artificial intelligence and machine learning in order to simplify and automate some business processes.

[45] Dave Chaffey, M. P. (2012). From web analytics to digital marketing optimization: Increasing the commercial value of digital analytics. Journal of Direct, Data and Digital Marketiting Practice, 43.

Table 2: SAMPLE OF KPIS FROM THE RACE MODEL BY LEVEL OF REPORTING

Metric Overall visits or broken down by channel	**Reach** Audience	**Encourage** Action	**Convert** to sale	**Engage** customers to retain
Tracking Metrics KPIs	• Unique visitors	• Online opportunity (lead) volume	• Online sales volume	• E-mail list quality
	• New visitors	• Off-line opportunity (lead) volume	• Off-line sales volume	• E-mail response quality
	• Visits			• Transactions
	• Conversation volume			
Performance Drivers KPIs	• Share of audience compared with competitors	• Bounce rate and duration measures	• Conversion rate to Sale	• Active customers percentage (site and E-mail active)
	• Share of search	• Macro-conversion rate to opportunity and micro-conversion efficiency	• E-mail conversion rate	• Active social followers
	• Brand/direct visits			• Repeat conversion rate
Customer-centric KPIs	• Cost per Click and per Sale	• Cost per Opportunity	• Cost per Sale	• Lifetime value
	• Conversation polarity (sentiment)	• Customer satisfaction	• Customer satisfaction	• Customer advocacy index (ex. Net Promoter Score) • Customer loyalty index
	• Brand awareness			• Products per customer
Business Value KPIs	• Audience share (owned media)	• Goal value per visit	• Revenue per visit	• Retained sales growth and value
	• Share of voice (conversations)	• Online product requests (n, £, percentage of total)	• Online-originated sales revenue and profit (n, £, percentage of total)	• Revenue per active customer

[Source: Journal of Direct, Data and Digital Marketing Practice]

2.3 AI TOOLS INTEGRATION INTO THE CUSTOMER JOURNEY

What it is more relevant from the analysis of the RACE framework is that takes into account seamless dynamic of the customer journey, integrating innovative solutions inside the digital strategy plan made by the marketer. Nowadays, the customer is unchained by the rigid structure of the funnel and it moves freely across all channels along the customer lifecycle: from a windows shopper[46] (type of customer that prefers to look at shop windows before buying) that examines a product without the willingness to buy it becoming, in a second moment, a first purchase consumer. This can then repeat the purchase and afterwards develops loyalty to our product or service; Fig. 7 depicts the path associated to all possible touchpoint he or she could encounter during the customer journey. Each touchpoint derives from a specific media channel (Paid - Owned - Earned Media) plus the component of Experience collected with the digital business activity:

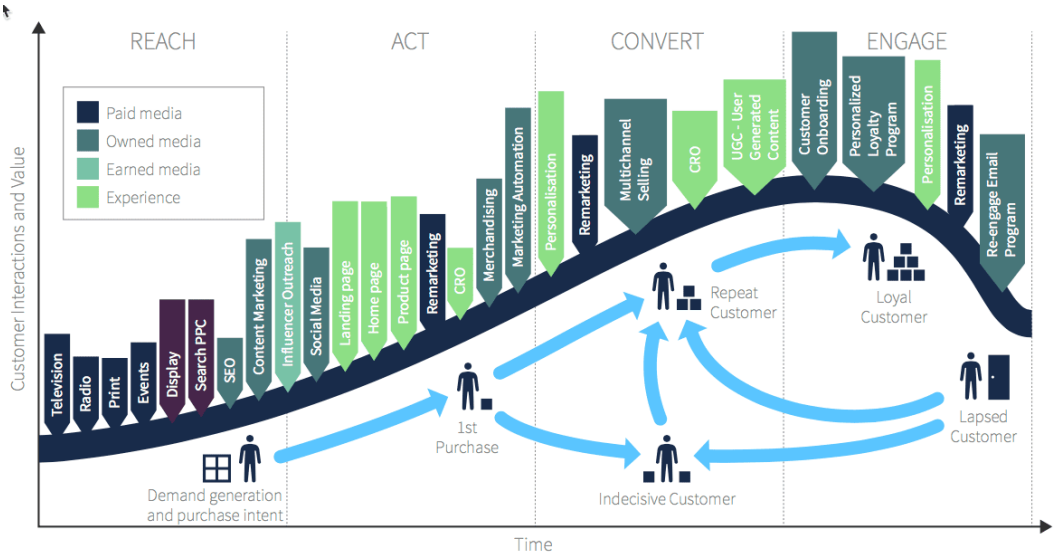
- Paid Media: it refers to all the media channels where it is needed to invest a specific budget to ensure relevance to audience to better increase brand awareness and/or advertise product/service. More digital channels are more and more becoming popular: Facebook Ads. Google AdWords are example

[46] Bloch, Peter & Richins, Marsha. (1983). Shopping Without Purchase: An Investigation of Consumer Browsing Behavior. Advances in Consumer Research.

of paid media channel; however, more traditional ones are still used (TV, Radio, Events).

- Owned Media: it refers to all media channels owned by the company, for this reason are completely and independently managed by it. Belongs to this category all the channels of social media, websites, email marketing and more.
- Earned Media: it refers to all media channels that are created by users thanks to the "words of mouth" or social sharing (reviews, shares, reposts, recommendations) and they are not under the control of the company.

Figure 7: CUSTOMER JOURNEY PER STEPS BY MEDIA CHANNELS



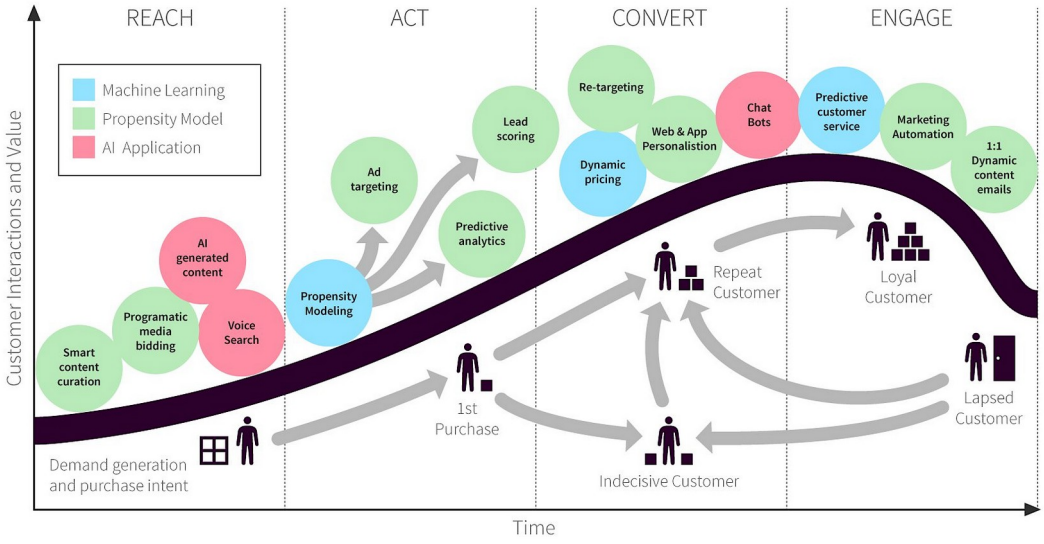
[Source: Smart Insights]

Going forward to the customer journey, artificial intelligence tools integration could enhance the experience for the customer and also simplify and automate some repetitive tasks for the marketer. It has been broken down different technologies of application of AI tools by the author of the framework as depicted in fig. 8, categories that are Machine Learning (ML), Propensity Model (PM) and AI Application (AI). As we have seen in the previous chapters, machine learning is based on algorithms made by historical data and AI applications are based on automated task executed in a very short period of time with respect of the time a human would have used. Afterwards, Propensity model is a machine learning approach that allows to predict a future behavior, action or risk considering past independent variables in probability and, applied to marketing, it is useful to understand and score a specific behavior of the consumer in a business context. [47] These three different categories reflects different application implying for the marketers consistent simplifications. To this purpose, Robben Allen identified 15 AI technologies[48] to be integrated into the RACE framework.

[47] Radcliffe, N.J., & Surry, P.D. (2012). Real-World Uplift Modelling with Significance-Based Uplift Trees. Stochastic Solutions White Paper

[48] Allen, R. (2017). 15 Applications of Artificial Intelligence in Marketing. Retrieved from https://www.linkedin.com/pulse/15-applications-artificial-intelligence-marketing-robert-allen/

Figure 8: AI TOOLS INTEGRATION INTO THE CUSTOMER JOURNEY



[Source: Smart Insights]

• REACH: for this stage, propensity model and AI applications find enforceability in terms of attractiveness and engaging of customers, SEO, Content Marketing and all the tools to reach the audience. In a more specific way:

1. Smart Content Curation (PM): this tool allows marketer to provide to visitors relevant content based on interest have or action they made and recommend it to the visitor: “You might also enjoy/like…”, “Other people buy it with it…” are example of efficient smart content curation. Spotify, Amazon, Apple Music, Netflix uses their AI-Driven platform for their platforms obtaining a

double-win strategy: the more visitors or users express their interests, the more accurate the platform will be because of more aggregate data available, combining sorted data and delivering pertinent results to the user's needs.

2. Programmatic Media Buying (PM): this technology identifies and delivers the best suitable ads to the most relevant customer. In the digital advertising, it means that the process of buying ad space in a website or platform is completely relied to the algorithms of the software that trades autonomously and efficiently with the platform. The benefit of this technology is to guarantee impressions to a target audience, ensuring a more efficient and convenient ad buying process providing better results.
3. AI generated content (AI): even though the level of development of AI is still not so advanced to create opinions or articles, some software is able to collect information and elements and create a content very close to a human one. An example of this application is Articoolo, a startup powered by IBM Alphazone, that generate high-quality content from words emulating a human writer. Another popular platform that exploits this technology is Wordsmith that is able to translate data into narrative text. It is used by companies such as Microsoft, Yahoo or PwC to generate content but in a near future will be useful to marketers for the generation of contents.
4. Voice search (AI): Voice search technology driven by AI is used as user experience enhancement by enabling the speaking into a search engine.

RankBrain, a Google's machine learning algorithm, outlined to recognize words and phrases to learn and better predict relevant outcomes for the user' voice. Voice search technology is going to positively impact for marketers with a specific regard on providing featured snippets (first place results on search), increasing the value of Position Zero in search results, prioritizing micro-moments and or simply delivering updates about promotions, sales and more. It is surely convenient to rely on existent platforms instead of creating a brand new one, due to high costs of research and data machine learning. The most used voice search AI platform are Amazon Alexa, Google Assistant by Google and Siri by Apple, companies that invested on voice assistants respectively on Amazon Echo, Google Home and Apple Homepod.

• ACT: in this stage, propensity model is predominant, providing support to the marketer to attract customers and make it aware of the product/service:

1. Propensity modelling (ML): as said previously, propensity model is responsible of predictions and forecasts made on the base of previous historical data elaborated through machine learning algorithms. In a marketing context, it is useful to understand in advance the right propensity to purchase of a specific group of audience or to score the probability that the consumer will perform a specific action in our website.

2. Ad targeting (PM): the use of propensity model can enhance the ad targeting identifying the right ad content for the right segment. This is translated into a more efficient ad placement saving costs with respect of traditional methods.
3. Predictive analytics (PM): the powerful results of propensity model are able to understand the prospect of a person to become customer, the odds of at what level of price he/she is more likely to buy or repeat a purchase and so on. The more evident application of this tool is the one made Netflix for the HBO original series of "House of Cards": from big data analytics of their subscriber, they predicted the interests and preferences that have led to the success of the series.
4. Lead scoring (PM): using propensity model, it is possible to determine and rank customer from "cold" to "hot" lead. This process is based on behavioral data of a customer and through its attributes, the lead scoring model provides a score for the achievement of that behavior. These attributes are customer profile demographic information, interests, purchase behavior and more. The goal of the company is to "warm" the customer in order to push it to the purchase step.

• CONVERT: in this stage, AI tools provide support to the marketer encouraging a prospect to become the customer of our product/service ending with the purchase:

1. Dynamic pricing (ML): machine learning can provide special sales or offers only addressed to a specific segment of audience that is more likely to be converted in a customer. This is translated to a more efficient and focused price strategy since it is possible to predict at which level of price the customer is willing to pay.
2. Re-targeting (PM): re-targeting is a marketing technology tool for which, though the use of cookies and other historical data based on traffic visits or actions (that for some reason didn't translated to the conversion), it is possible to provide advertising based on the behavior of the prospect. The most well-known example of re-targeting is Pixel by Facebook, a powerful tool that allows marketers to create and monitor ads campaigns based on the traffic of a visitor.
3. Web & App Personalization (PM): propensity model can improve and tailor a website or app for the customer experience with relevant content. This leads to an improved customer experience for the visitor, increasing customer engagement and brand loyalty.
4. Chatbots (AI): as described in the first chapter, chatbots are a powerful tool to be integrated by a company in its marketing strategy. It allows to automate messages to you customer and consequently be always online 24h/24h, increasing the amount of marketing conversations. Chatbots can be used to collect personal data from customer in a more customized way with respect

of contact form, to provide common FAQs instantly saving time of response. The most used and integrable chatbots service is Facebook Messenger that, through an integration of a plugin into the website, allows visitors to interact with your business page.

• ENGAGE: the last step it is based on the post-purchase management of customer relationship, building and facilitating brand loyalty and engagement:

1. Predictive customer service (ML): this machine learning application permits to predict customer needs in terms of support, and provide it not only when the problem occurs but predicting the issue in advance. By clustering same customers with similar problems, the system early predicts the needs providing a superior customer service. Consequently, this prediction saves time in terms of avoiding misroutes, reducing inbound call-service volume and costs. Furthermore, a better customer support service can reduce dramatically the churn rate.
2. Marketing automation (PM): this application of propensity model simplifies repetitive tasks of the marketers with automatic and digital tools. In particular, marketing automation is adopted through automated platform for the strategic creation of email marketing, customer relationships management, data analytics, lead management and landing pages. Some platforms are able to create a single eco-system in which all the tasks are supported and integrated

in order to be in harmony and efficiency in the strategy through all channel (omni-channel approach). The final idea is to allows marketers to have a unique big picture of activities and tools powered by the automation and analytics.

3. 1:1 dynamic emails (PL): on the same wave of the marketing automation, the use of propensity model provides sufficient analytics to create an effective and targeted email marketing campaign, based on subscribers' tastes, interests and category of products they are most likely to be interested in. The same approach is applicable to push notification of smartphone application, direct messages or simply through SMS texts.

2.4 THE CRUCIAL ROLE OF TRUST FOR AI PLATFORM IMPLEMENTATION: ACCURACY, ALLIGNMENT AND PRIVACY

The "sine qua non" condition to the success of the integration of the artificial intelligence solutions is the customer's confidence. Indeed, without an appropriate customer data treatment, the integration is not likely to success in the long run. In order to provide an appropriate and tailored content, if from the company side there is the burden of collection and management of customer's data, from the customer side it has to be the permission and approval to provide personal and sensitive data. This is the reason why companies should consider boosting competencies in the

platform in terms of accuracy, alignment and privacy to better handle the customer loyalty and satisfaction.[49]

- § Accuracy: it determines the data quality of the collected information. Collecting data on data, the platform is able to suggest recommendations suitable with the user. Moreover, the more the interactions of the user with the AI platform, the more the AI assistant learn and improve the customer experience.
- § Alignment: it determines the way data are arranged and saved into the platforms and how they are used for customer purposes. The customer loyalty could be damaged if the recommendation for a product is not perfectly useful for the customer. For this reason, it is the duty of the company to ensure transparency with regards of arrangements among brands.
- § Privacy: it determines the treatment of data and the share policy whether and how data are handled with third parties. This is the most pressing aspect to be treated.

Indeed, as said before, the more the users' data are collected, the more precise the platform will be. But this big amount of data collected may be seen by the user as a violation of privacy with the consequence of rejection over the platform. A very dramatic example of data violation was the scandal of Cambridge

[49] Porter, M. E., Davenport, T. H., Daugherty, P., & Wilson, H. J. (May 2019), AI, Analytics, and the New Machine Age (with Bonus Article "Why Every Company Needs an Augmented Reality Strategy. Harvard: Harvard Business Review.

Analytica in 2018 when personal data of more than 50 millions of users were used for political purposes without the direct consensus of them.[50] From this breach, Facebook introduced tools for the customization of privacy settings, letting the user to freely access and/or delete information when they want, and European Union speeded up the entry into force of GDPR (General Data Protection Documentation) for the treatment of EU citizen's data inside-outside EU. The theme of collection of sensible data, from reason of user's profiling to retargeting, is increasingly being relevant and more and more debated. Indeed, till today it isn't a common and shared policy in matter of treatment of user's data: if in the European Union the normative is very severe and delineated, in other continents as North America or Asia the law structure is flexible and more dispensable. A clear and current example is the data tracking application to avoid COVID-19 outbreaks in South Korea[51]: if in the Asian country the development and the adoption has been rapid and smooth, Italy is encountering slowdowns and difficulties in the management of sensible and personal data without violating Italian laws in matter of privacy. [52] This evidently highlights deep differences in terms of treatments among countries. In order to fill

[50] Emma Graham-Harrison, Carole Cadwalladr, 2018, Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach, the Guardian

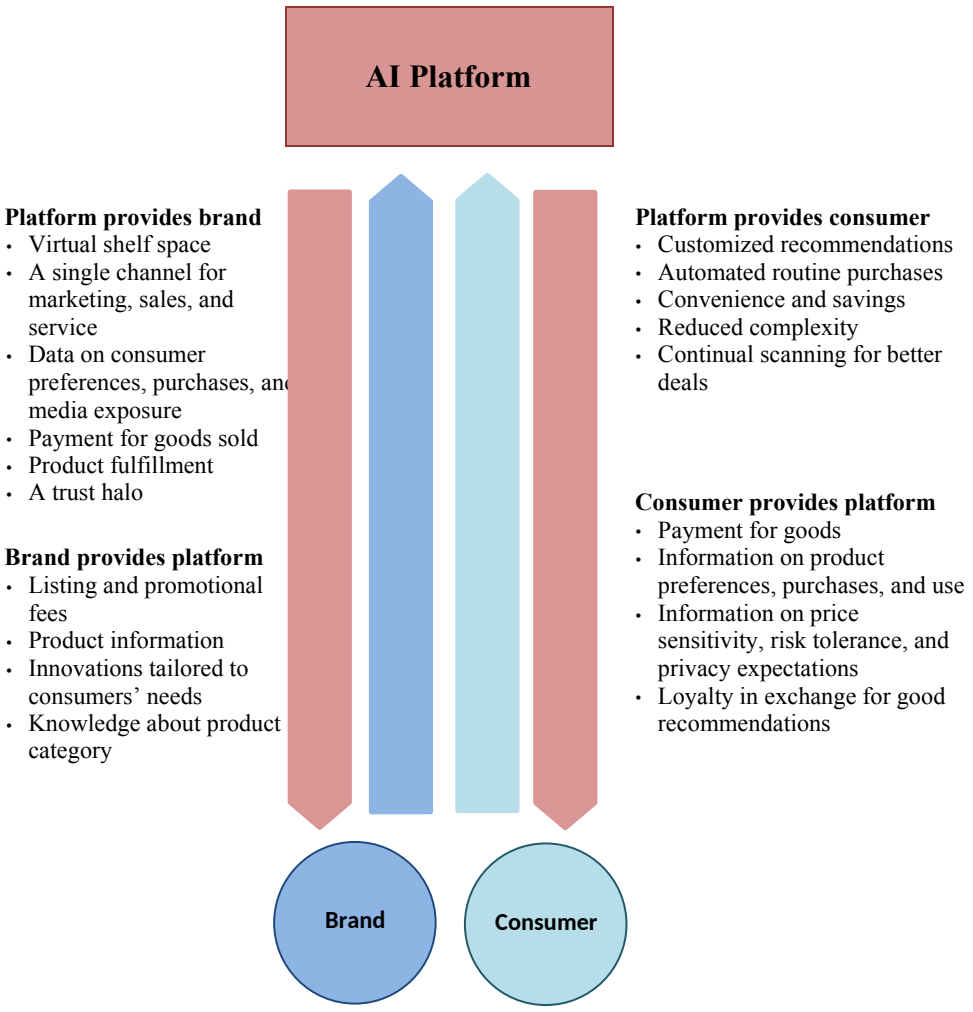
[51] Holmes, A. (2020). South Korea is relying on technology to contain COVID-19, including measures that would break privacy laws in the US — and so far, it's working. Retrieved from Business Insider: https://www.businessinsider.com/coronavirus-south-korea-tech-contact-tracing-testing-fight-covid-19-2020-5?IR=T

[52] Yasheng Huang, M. S. (2020). How Digital Contact Tracing Slowed Covid-19 in East Asia. Retrieved from Business Review: https://hbr.org/2020/04/how-digital-contact-tracing-slowed-covid-19-in-east-asia

up this disarrangement and help marketers to be always aligned with the normative of the countries where they are operating, Iubenda, a consent management platform, provides services to generate privacy policies and legal notes for websites or mobile applications. In this way, from the company point of view, it is always updated on law changes whilst, on the visitor's side, it ensured the possibility to manage the level of data provided, allowing him to directly control what type of data the platform will collect with the visit.

According to Niraj Dawar, one of the authors of "Marketing in the age of Alexa", AI platforms will concretely change customer relationship, with the shift of focus from traditional capabilities and assets of the brand to the predictive ability of the AI assistant platform**.** As a consequence, pull marketing (persuasion) will become less effective and the other hand, push marketing will find a relevant role in promotion of product, the one best aligned with tastes and preferences gathered by the user into the platform. Winning the trust and loyalty of the users, it is conceivable that in a nearest future, AI platform will assist consumer in an endless customer journey, predicting and offering what we surely need, becoming the principle mediator between brands and consumers.

Figure 9: HOW AI PLATFORM INTERACT WITH THE CONSUMER/BRAND TO CREATE VALUE



[Source: Harvard Business Review]

CHAPTER 3

THE CASE STUDY OF BYTEDANCE

3.1 BEHIND THE SUCCESS OF TIKTOK

TikTok is one of the most successful and interesting mobile social network app for video content creation of the last few years and the one more promising in terms of active users growth for the next decade. With over 800 millions of active users, TikTok is spreading out around the world redefining the panorama of social media network for mobile video contents.

To better understand the evolution of the platform, it is useful to retrace the milestones of the history of the companies that rapidly permitted ByteDance to become the world's most valuable start-up with a value of $100 billion in 2020.[53]

3.1.1 HISTORY OF BYTEDANCE

All started when Zhang Yiming, a young Chinese entrepreneur, noticed the dramatic decline of the newspaper industry and in the same time the strong increase in number of smartphones and mobile devices. Moreover, he truly believed in the potential of AI in creating solutions to humans since his experience as engineer at

[53] Bloomberg. (2020). TikTok-owner ByteDance said to surpass US$100 billion in private market value. Retrieved from South China Morning Post: https://www.scmp.com/tech/start-ups/article/3085293/tiktok-owner-bytedance-said-surpass-us100-billion-private-market

Kuxun and after at Microsoft. For this reason, in March 2012 he soon decided to establish the company ByteDance, with the aim of providing suitable contents for users based on their interest. No sooner said than done, in August 2012 Zhang launched Toutiao[54], a news mobile application that catalogues aggregate news and contents through AI from other media platforms and provide them to user with personalized feeds based on what the users wanted to read. What is remarkable is that for the first time in China a mobile app showed automatically contents instead of searching it and the more the content were read, the more Toutiao learned interest and preferences giving users appropriate recommendations. Obviously, this key-features lead to the success of the app, that reached in less than 4 month 1 mln of daily active users and 13 mlns in two years.[55] In August 2015, ByteDance launched TopBuzz in the US market, a content mobile platform that provides videos, GIFs, viral content and also breaking news through a content aggregation based on machine learning algorithms. In the same vein, in September 2016, ByteDance launched A.me subsequently rebranded to what today is called Douyin, a video platform based on short, catchy and funny videos for teenagers. In the first six months of development, the team developers stressed on finding the core audience to entertain and changing the UI of the application to be catchier for young early

[54] The literal translate is "Today's Headlines"
[55] Hariharan, A. (2017). The Hidden Forces Behind Toutiao: China's Content King. Retrieved from Y-Combinator: https://blog.ycombinator.com/the-hidden-forces-behind-toutiao-chinas-content-king/

adopter. After a year from the debut, on September 2017, Douyin was launched worldwide under the name of TikTok and with different servers with respect of the Chinese version: the app experienced an incredible growth under the boost of TV sponsorships and moreover, it was introduced the possibility to add effects, filters and stickers on the videos uploaded on the platform. Moreover, a live-stream feature was introduced to relevant users (>50k followers) allowing them to be more in contact with their audience.

In another Chinese city, Shanghai, in 2014 Luyu Yang and Alex Zhu was developing musical.ly, a social media service in the Chinese and American market. Even though they previously invested on an educational platform for children and teenagers with 3-5 minutes long videos, they decided to shift their focus on mobile teenage entertainment. This new app was based on the sharing of video content from 15 seconds to 60 seconds, accompanied with sounds and songs for lip-syncing with effect and filters. The app was literally a success, especially in the American market, creating a real community of "musers"[56] around the world, reaching in May 2016 70 mln downloads with more than 10 mln of daily users. [57] With the success of musical.ly, the two developers decided to reach more audience entering into the livestreaming market and launching in June 2016 the app Live.ly, a concrete

[56] From the merge of musical.ly and users
[57] Carson, B. (2016). How a failed education startup turned into Musical.ly, the most popular app you've probably never heard of. Retrieved from Business Insider: https://www.businessinsider.com/what-is-musically-2016-5

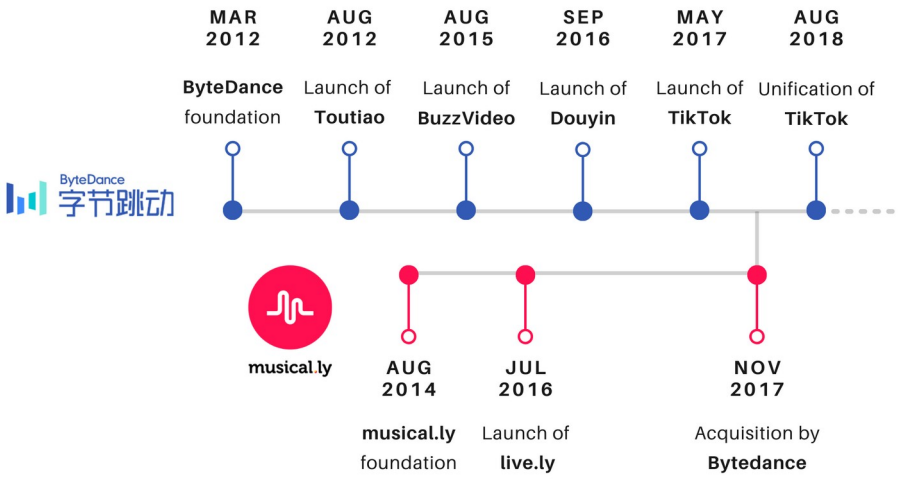
competitor of Twitter's Periscope. The success was undeniable for a company not owned by American Giant as Facebook or Google so that Zhang Yiming saw concrete prospective of acquisition to enhance the expansion in US. So it was. According to financial indiscretions from WSJ and Bloomberg, in November 2017 ByteDance bought the popular karaoke-video app for teens Musical.ly around $800 Million - $1 Billion[58]. ByteDance probably understood the importance and the relevance of the teen audience, the one that is more likely to be highly attracted by advertisement, the one more open to modernity and tending to be early adopter and, as a consequence, a potential long-term user for the platform. Furthermore, even though the two application were developed in the same country, they turned out to be complementary in the market, making the acquisition truly strategic: if Douyin/TikTok found fertile ground on his belonging country (Douyin for China, TikTok for other Asian countries, less elsewhere), musical.ly found it on the American one, becoming both popular platforms among teenagers. One of the founders of musical.ly, Alex Zhu (now vice president of TikTok), affirmed "We are excited to enter into a new chapter. TikTok, the sound of a ticking clock, represents the short nature of the video platform. […] Combining Musical.ly and

[58] Lin, L., & Winkler, R. (2017). Social-Media App Musical.ly Is Acquired for as Much as $1 Billion. Retrieved from The Wall Street Journal: https://www.wsj.com/articles/lip-syncing-app-musical-ly-is-acquired-for-as-much-as-1-billion-1510278123

TikTok is a natural fit given the shared mission of both experiences – to create a community where everyone can be a creator". [59]

What is surely undeniable is that in eight years, ByteDance invested on the media industry and artificial intelligence, spacing from education passing on news app to arrive entertainment, creating a hub of mobile media services available in more than 150 countries with 75 different languages. With strategic acquisitions of well-placed companies around the world, Yiming was quickly able to conquer new international markets over China, acquiring media expertise and know-how to conquer teen users and today not only them.

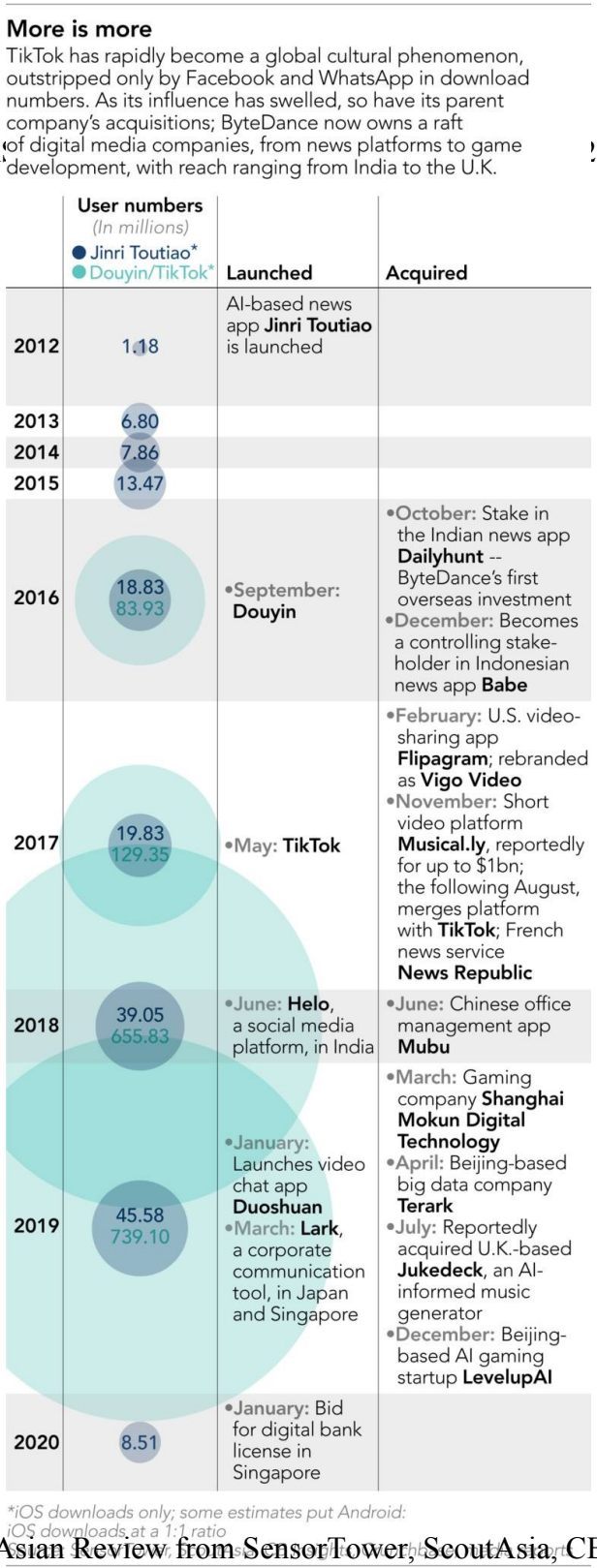
Figure 10: MILESTONES OF BYTEDANCE AND MUSICAL.LY



[Source: Personal elaboration, data retrieved from ByteDance.com]

[59] Dave, P. (2018). China's ByteDance scrubs Musical.ly brand in favor of TikTok. Retrieved from Reuters: https://www.reuters.com/article/us-bytedance-musically/chinas-bytedance-scrubs-musical-ly-brand-in-favor-of-tiktok-idUSKBN1KN0BW

Figure 11: USER[illegible]2012 TO 2020

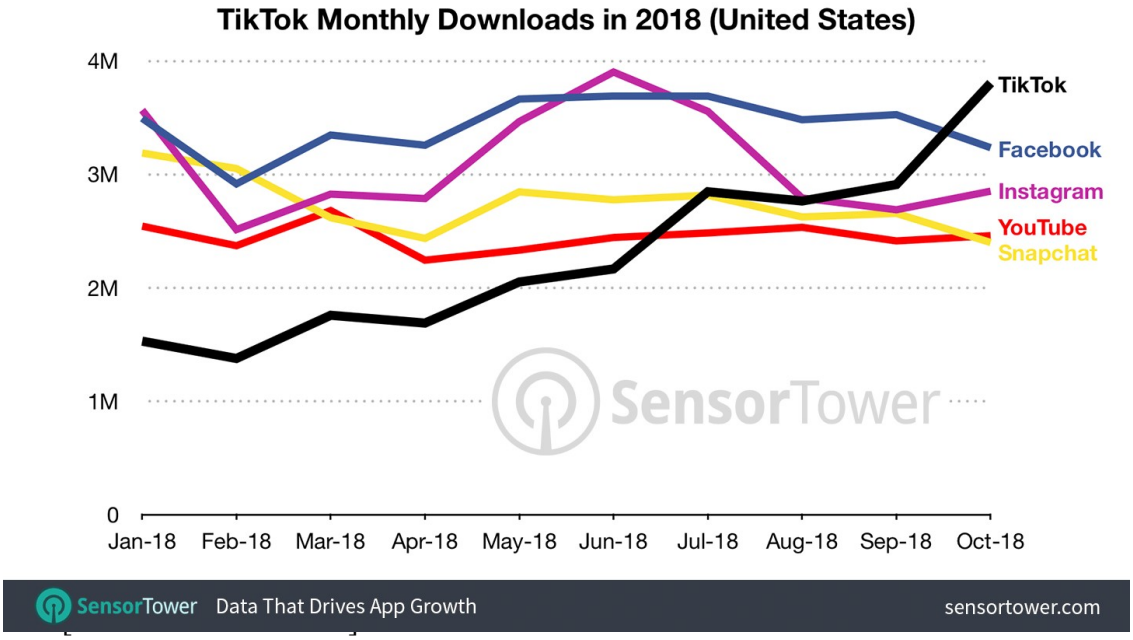


[Source: Nikkei Asian Review from SensorTower, ScoutAsia, CB Insights media]

3.1.2 RELEVANT NUMBERS AND DATA

The digital storm created by Douyin/TikTok is evidently demonstrated by numbers collected in the years: in the Q1 2018, TikTok reached the primate for the most downloaded app for iOS worldwide with 45.8 million of downloads and downloaded more than 104 million on iOS devices in the first half of the same year, outperforming YouTube, Facebook, Instagram and WhatsApp[60].

Figure 12: TIKTOK MONTHLY DOWNLOADS IN 2018 (US)



[60] Nelson, R. (2018). The Top Mobile Apps, Games, and Publishers of Q1 2018: Sensor Tower's Data Digest. Retrieved from SensorTower: https://sensortower.com/blog/top-apps-games-publishers-q1-2018

According to SensorTower, in 2019 TikTok reached around 738 million downloads and gross revenues equal to $176.9 million, 71 percent of all-time gross revenue of $247.6 million[61]

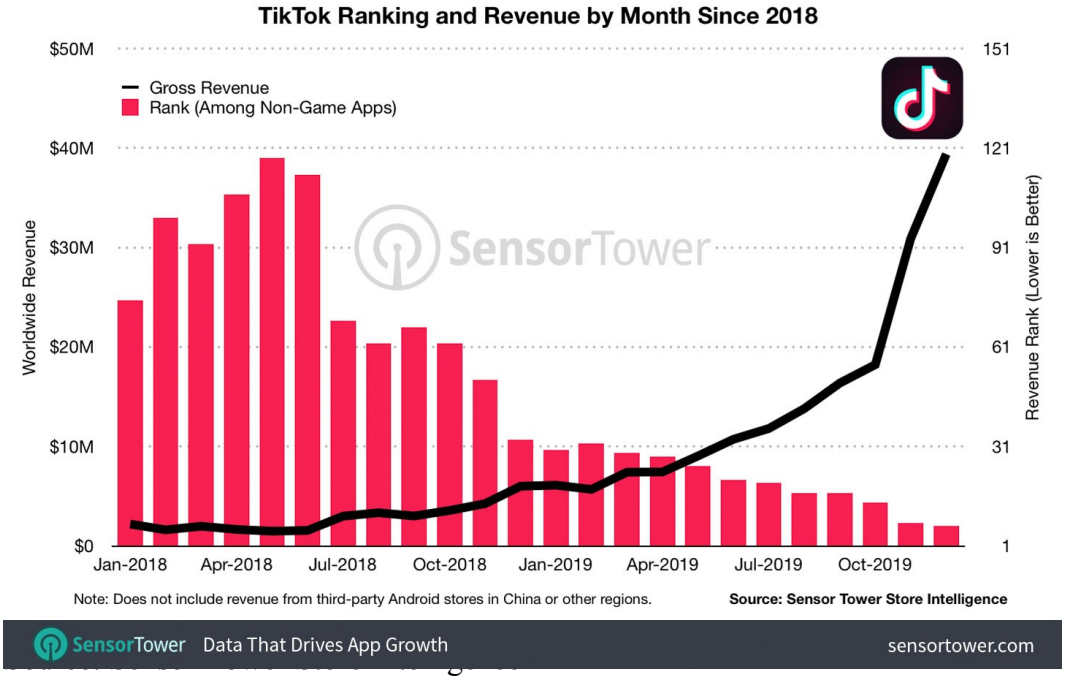
From Q1 2017 with 22.4 million of global downloads, TikTok achieved quote 315.0 million on AppStore for iOS devices and Google PlayStore for android ones, registering 2 billion as total global downloads, an incredible number for a relative recent social network.

To have a quick comparison, Facebook collected 186.1 million of mobile devices installs and Instagram 151.8 download. Surely, the dramatic increase of the Q1 2020 was determined by the COVID-19 outbreaks worldwide that led people to discover new ways to stay connected with exclusive social networks. [62] India is the country where the app has been downloaded with 467 installs, followed by China and US respectively 45.5 and 37.6 million.

[61] Williams, K. (2020). TikTok Was Installed More Than 738 Million Times in 2019, 44% of Its All-Time Downloads. Retrieved from SensorTower: https://sensortower.com/blog/tiktok-revenue-downloads-2019

[62] Chapple, C. (2020). TikTok Crosses 2 Billion Downloads After Best Quarter For Any App Ever. Retrieved from SensorTower: https://sensortower.com/blog/tiktok-downloads-2-billion

Figure 13: TIKTOK RANKING AND REVENUES BY MONTH SINCE 2018



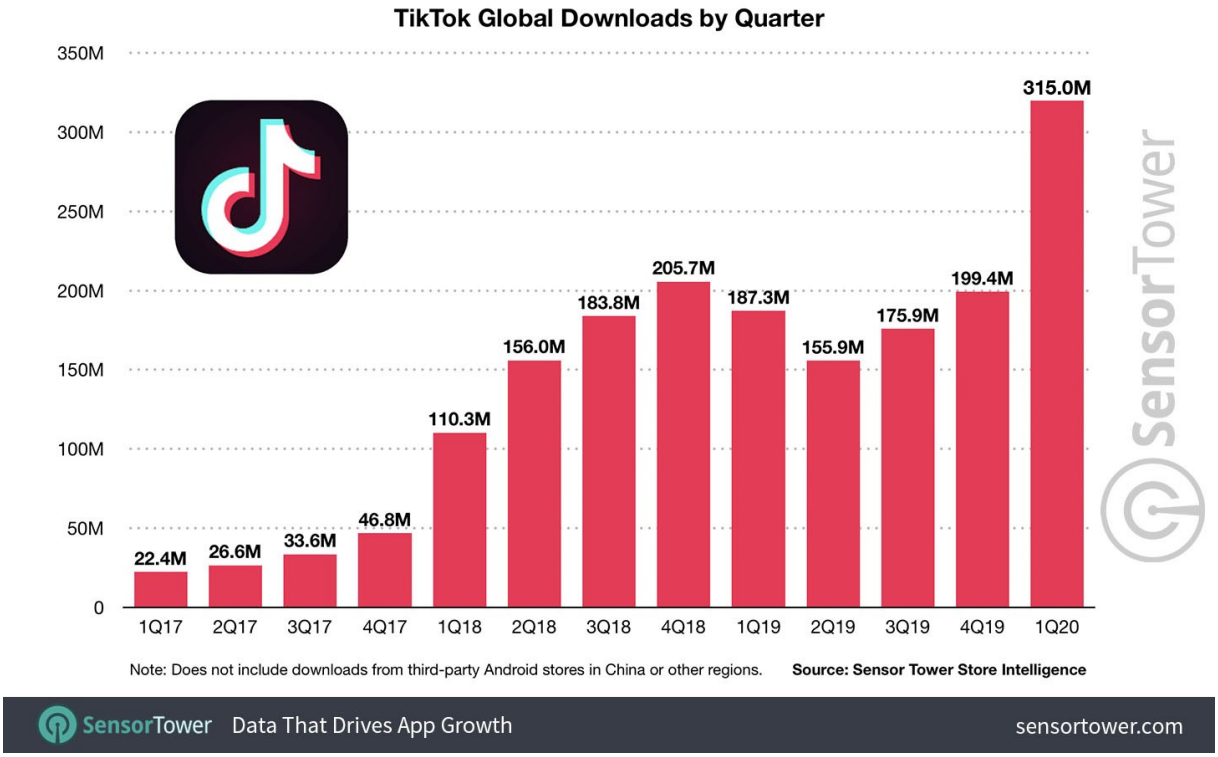
Recently ByteDance was valued more than $100 billion, a value that has increased by a third with respect of 2018 when the startup was considered the most valuable start-up with a value of $75 billion.[63]

Even though the company has recently faced privacy conflicts with the US legislation concerning user data collection on their Chinese servers, banning in

[63] Chen, L. Y., & Bergen, M. (2018). 35-Year-Old Unknown Creates the World's Most Valuable Startup. Retrieved from Bloomberg Businessweek: https://www.bloomberg.com/news/articles/2018-09-28/35-year-old-unknown-creates-the-world-s-most-valuable-startup

Asian countries (India, Indonesia) due to disturbing contents to children, the popularity of TikTok seems to raise over time.[64]

Figure 14: TIKTOK GLOBAL DOWNLOADS BY QUARTER



Indeed, with regards of active users, with 800 million TikTok is placed on the 9th position on worldwide social network according to DataReportal 2020 that

[64] Reuters. (2019). Indian court lifts ban on TikTok video-sharing app in victory for China's ByteDance. Retrieved from South China Morning Post: https://www.scmp.com/news/asia/south-asia/article/3007561/indian-court-lifts-ban-tiktok-video-sharing-app-victory-chinas

annually provides statistics of global social media overview.[65] Regarding the gender distribution of US users, the social network is used in 2020 mostly by female audience (56.5%) with respect of remaining male (43.3%).[66]

Those active users are mostly teens (41%), with an age comprises between 16 and 24: the attractiveness to this audience is surely dictated by the predisposition of the younger generation to be early adopter of a technology and so a new social network, for more an entertainment platform. However, new group of audience is approaching to the platform indeed the number for adults is increasing over time: a study conducted by MarketingCharts in 2019 showed a growth of US adult users increased to 14.3 mln in March 2019, almost 5.5 times more since 2.6 mln in October 2017.[67] Although these trends are related to US, it is plausible that same numbers will be followed by European countries in the next few years.

[65] DataReportal. (2020, April). Global Social Media Overview. Retrieved from DataReportal: https://datareportal.com/social-media-users
[66] Clement, J. (2020). Distribution of TikTok users in the United States as of January 2020, by gender. Retrieved from Statista: https://www.statista.com/statistics/1095201/tiktok-users-gender-usa/
[67] MarketingChart. (2019). TikTok: How Fast Is It Growing in the US, And Who's Using It? Retrieved from MarketingChart: https://www.marketingcharts.com/digital/social-media-108342

3.2 INSIDE THE APPLICATION

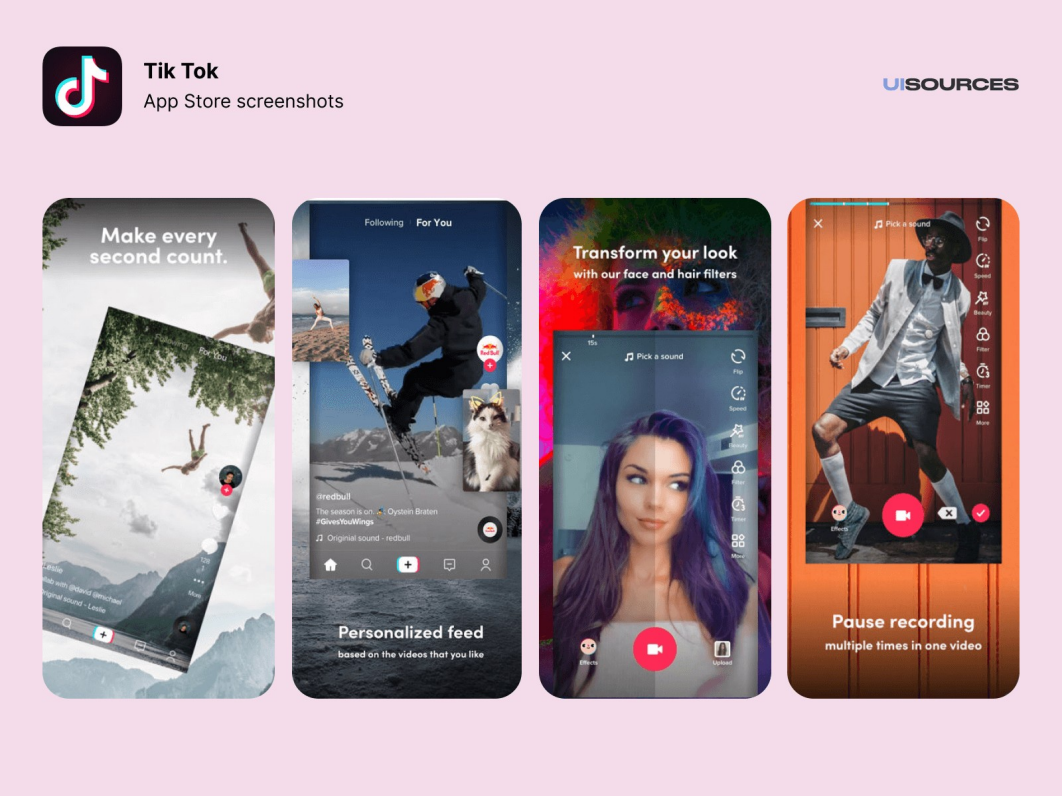
The whole social network is based on the watching and creation of videos round which the user experience rotates. TikTok provides a seamless and continuous stream of video without interruptions. To date, the application experience is available only for mobile devices, so we still have to wait for the desktop version.

Since the first opening of the application, TikTok lets the user select categories of interests to firstly target the content feed. After the selection (that varies from food to sports or hobbies and more), immediately the user is immersed into the platform without registration, enjoying right away the videos suitable for him. Indeed, the first section is called “for you page”, a sort of feed full of videos based on preferences and interests of the viewer. The user can leave like, comment, directly follow the creator without entering into its profile and share the content with other platforms. With respect of other social network, TikTok allows to freely share the content with a variety of other platforms (WhatsApp, Instagram, e-mail, Facebook, Twitter, and more). Probably this feature is dictated by the moment of booming of the social network, a way to attract new users to the platform through the sharing of contents.[68]

[68] The shared content embeds a TikTok watermark on the corner of the video and the name of the creator. In this way, in every platform the video is watched, the viewer can easily track down the provenience and the creator, nurturing TikTok itself but also the creator of the content

3.2.1 TIKTOK COMPETITIVE ADVANTAGES

Surely, a strength of TikTok is the video creation essence: every user can record and edit videos without professional skills and be reached by a very wide audience. The app includes start-stop recording video editors, the possibility to add filters, effects, transitions, stickers, greenscreen backgrounds and especially music. In fact, the audio could be considered a key feature that could be added to the content: songs, music, user audio plays a crucial role in the creation of the content.



[Source: UISOURCES]

However, the strength of TikTok is identifiable not only on a fresh UI/UX but mostly on the facts that:[69]

1. Most of the contents are very short, **15 seconds of vertical full screen videos, mobile only**. The content is made in a way to catalyze as much as possible audience's interest.
2. To catch the user attention, the app serves content **avoiding pauses and interruptions** since the first launch of the application. By swiping up, users enjoy the videos without limits.
3. Thanks to the **artificial intelligence algorithms**, the platform provides relevant contents on behavior bases, without asking to the user what he/she wants to watch.
4. In order **to avoid monotony and sense of boredom**, the app algorithm generate an **intermittent variable reward** for which at a certain point, the app shows a new content that may not be aligned to the user's preference.
5. Put emphasis on the **easiness for the creation of content**. Indeed, with respect of other platforms, such as Instagram or YouTube, professional graphic skills are needed in matter of creation of photo contents or video making. TikTok breaks down this wall, **allowing every user to be creator.**

[69] Yu, S. (2019, Sep). Why is TikTok sweeping over the world? — an app critique. Retrieved from UX Design: https://uxdesign.cc/why-is-tik-tok-sweeping-over-the-world-e06ab94262e8

This concept raises the value of the platform pushing the spreading of the **user generated contents,** contents that are all posted by users without necessarily professional skills. Indeed, duets, reactions and lip-syncs are only few examples of user contents that could be created in a simple and fast way.

6. At the moment it provides a **massive organic reach**. Since the initial phase of the social network, as for example Instagram was, in order to attract new users, sponsored and paid advertisements are deleterious. For this reason, nowadays TikTok is an interesting challenge for business and e-commerce.

These key features make TikTok an unique platform with high potential for users and companies.

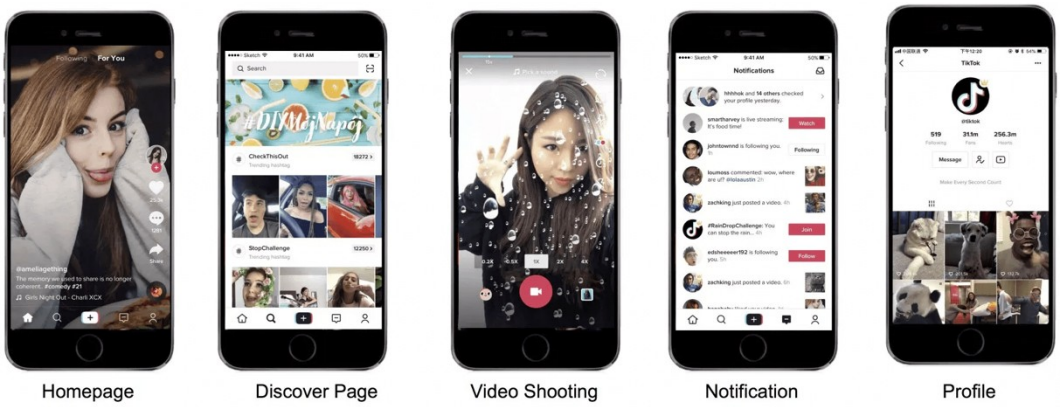
3.2.2 USER INTERFACE

Going forward into the User Interface, the app is composed by five sections in order:

1. **Home**: it is composed in turn by **For You** page and the **Following** page. The first one could be considered the core of the app since automatically pop up at the opening and it shows contents aligned with the user's expectations and that it might like. While, the following page encompass all video coming from followed profiles. The video presents a caption with text and eventual hashtag, name of the creator, with the possibility to reach the

profile by tapping the name or profile image**.** On the bottom of the caption, it is present the audio track used. On the right edge side, four tabs are columned: pic profile with the shortcut to directly follow the profile, number of total likes touchable to leave a like, comment section and share button. Moreover, touching the screen, the video will be paused while holding it, it will be showed some hidden shortcuts such as save video, add to favorite and report content if against the policy of the app.

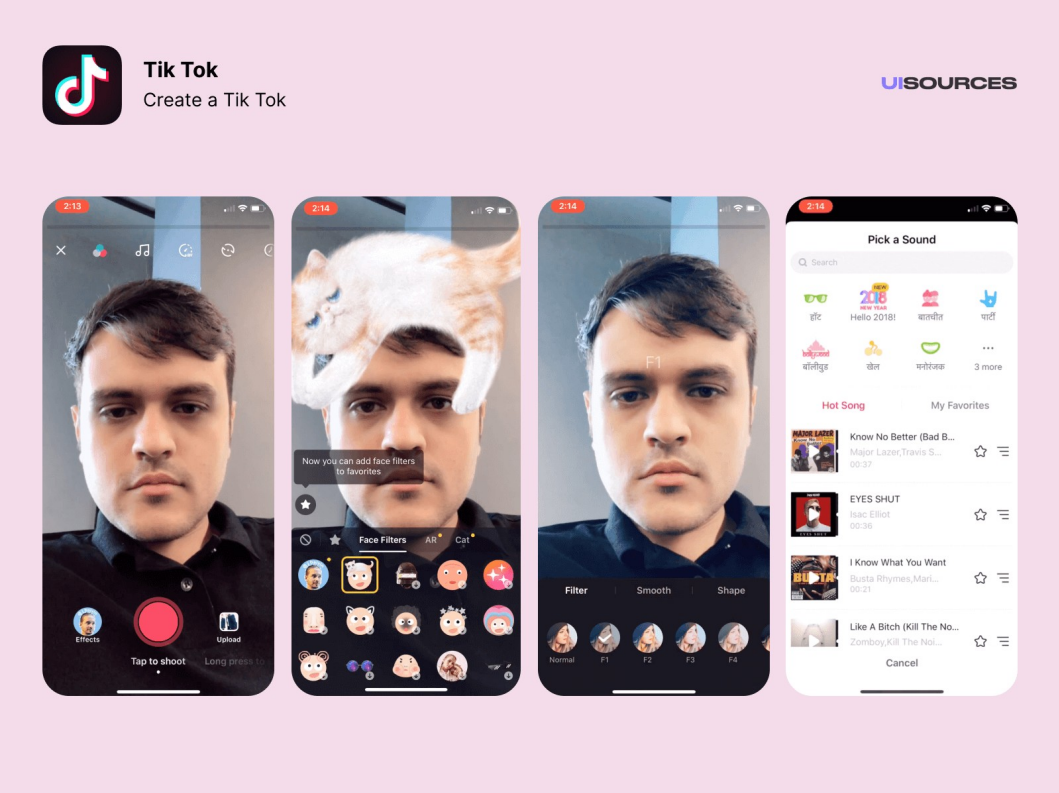
Figure 16: HOME, COMMENT AND SHARE SECTION USER INTERFACE



[Source: DIGIDAY]

2. **Discover:** the section provides inspirations and cues for the creation of contents, users trending hashtags and search box to find others. The banners on the top shows TikTok trends of the moment. Moreover, people can find other users by searching with text or add through the scan of a TikCode.

3. **Video:** from this section the user can easily create short contents, including filters, stickers, text, effects, music and more.



Source: UISOURCES]

4. **Notification:** the section encloses all the notifications in matter of activities such as like, comments, mentions, followers and from TikTok
5. **Profile:** the section shows the user profile with the count of total followings, followers and the number of likes. What is interesting is that TikTok allows users to embed a shortcut to connect your TikTok profile with the Instagram or YouTube one. Furthermore, TikTok created a referral system to invite

friends and contacts to join the platform. Each invitation correctly done provides to the inviter user diamonds. These diamonds can be exchanged for real cash reaching a determined limit allowing users to gain real money.

3.2.3 WHAT MAKES TIKTOK UNIQUE: ALGORITM AND VIRALITY

It is undeniable that the strength of TikTok is on the agile creation of contents and in easy virality of it. Indeed, the more a content is showed to a large batch of users, the more the video will gain popularity and views. TikTok exploits its algorithm to deliver contents with a very accurate relevance through some mechanisms. Many users tried to do a reverse engineering of that mechanism in order to exploit it and become popular and viral to get more views and follower. ByteDance didn't release any explanations about how the content becomes viral but many users noticed and theorized it. According to Joseph Todd, the algorithm is based on the fact that establishes a sort of test for the content and it shares it into the for you page. TikTok's algorithm pushes contents based on the so-called Evaluation, an overall performance indicator of the video composed by three variables:

1. Watch time: how many seconds the user remains on the video

2. Engagement variety: what kind of actions the user does: like, share, react, visit on the creator profile and so on. Each action has a different relevance for the algorithm
3. Engagement velocity: how much the video is watched considering watch time completion. Basically, how many times the video is re-watched in a single view.

Moreover, the algorithm takes into account the number of likes, share, number of total downloads if enabled and comments. It seems that TikTok created a point-based system for its contents with certain engagement action that rates the content: 1 point like, 2 points comment and probably 3 or 4 points share/react/duet. This choice may be dictated by the fact that the platform tries to push creators to create as much as possible, delivering new contents and sticking users longer to it.
The algorithm takes also into account the so-called account authority or account ranking that is the account relevance into the platform. [70] It is determined by many factors that enclose the overall behavior on the social network:

- One account per device: multiple accounts may flag the user as business account and deprioritize it as it happens in another social network

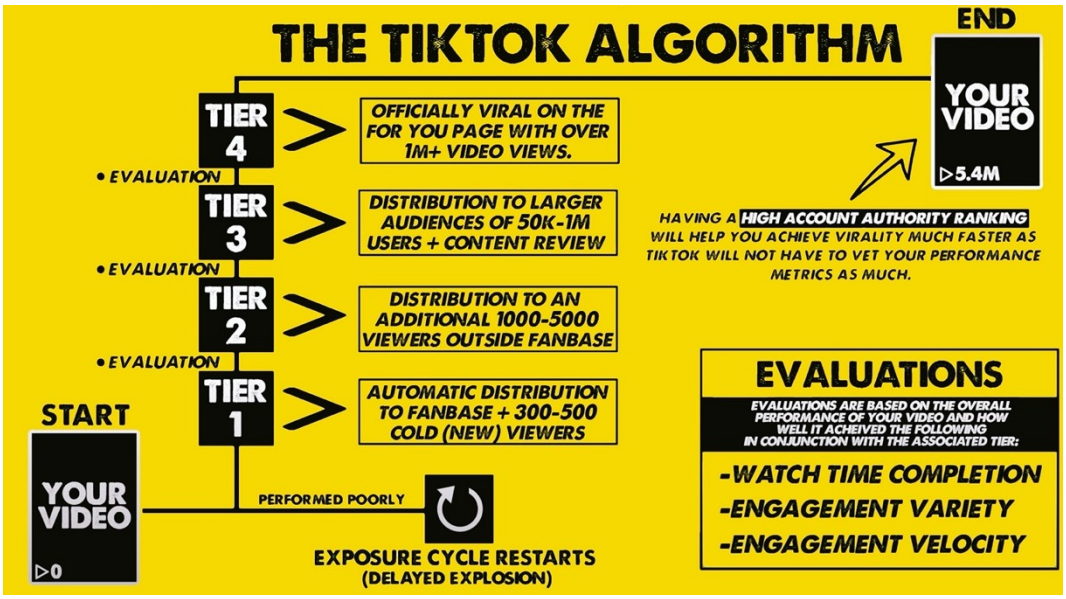
[70] Patterson, G., & Donovan, H. (2020). Leveraging TikTok for growth. Retrieved from TechCrunch: https://techcrunch.com/2020/02/17/leveraging-tiktok-for-growth/

- Viral, bad, deleted contents: all the content posted matter. It seems also that the first five video will determine your future trend and position in the platform.
- Consistency on posting: the more there is consistency, the more the platform reward you with visibility
- Theme uniformity: tackling the same topics and format prioritizes your
- Re-watch and view completion: these metrics will consider how many reviews and if the content is entirely watched
- Use of trending hashtags
- Use of original sounds

Going concretely deeper into the algorithm, the overall mechanism of content distribution is based on a tier-system. After the publishing of the video, the content is pushed through an automatic distribution channel to your fanbase and to an audience around 300-500 cold new viewers (TIER 1) with an authority-based automatic distribution. If the video poorly performs, then it remains static until an eventual exposure cycle restart made by the platform. Indeed, with respect of other social networks, TikTok periodically exposure again the content into the for you page, hiding the upload date and independently how the video performed in the first instance of the publishing. Whilst, if the content uploaded reaches some limit criteria, then it will push to the TIER 2 in which the content will be shown to a

larger batch of for you page's users, around 1-5k viewers, outside the fanbase. Again, reaching some limits, the video will pass to the next level, TIER 3: the content will be shown to audience of 50k-1M users plus, the platform through an integrity-based AI review and data collection makes a content reviews, ensuring the content is not violating TikTok policy terms or copyrights. The last TIER 4 is the level on which the content has become viral and popular, reaching an incredible for you page audience collecting more over 1M video views. This mechanism makes TikTok a powerful platform for virality, boosting contents and more engagement.

Figure 18: CONTENT FLUX FOR THE TIKTOK ALGORITHM



[Source: Joseph Todd from YouTube]

3.3 TIKTOK FOR DIGITAL MARKETERS

In the phase of the definition of digital strategies, TikTok may be considered a platform to invest in since it seems to be the next trendy social network for the next years (as it was for Instagram) [71]. For this reason, marketers should seize the moment and decide to invest in advance on this platform. If your companies niche is to attract or engage Gen Z [72], TikTok may be the perfect way to penetrate this market. Indeed, according to multiple studies, generation z has an increasingly purchasing power for e-commerce. [73] Even though, as it was previously said, the application found the majority of its audience in early generations, this does not mean an exclusivity to marketing purposes for other niches such as millennial or older generation. For this reason, TikTok on one hand tries to attract as much as possible users to be creators, on the other side, it is developing a powerful advertising platform to live up its audience and companies for business. Nowadays the idea of a platform based on paid advertising is still immature but TikTok is investing on this side, in fact, the claim reported on the official website for the advertising section is "Connecting brands today with the consumers of tomorrow" [74]. By using TikTok Ads, ByteDance enhances the advertising platform

[71] Ovide, S. (2020, May). TikTok (Yes, TikTok) Is the Future. Retrieved from The New York Times: https://www.nytimes.com/2020/06/03/technology/tiktok-is-the-future.html
[72] Today's teenagers with an age comprises between 13-18.
[73] Deloitte. (2018). Welcome to Generation Z.
[74] TikTok. (n.d.). TikTok Ads Homepage. Retrieved from TikTok: https://ads.tiktok.com/homepage/

by letting users publish ads to other family apps such as Vigo Video, Helo, Babe (entertainment apps) and to TopBuzz, BuzzVideo and NewsRepublic (news or content discovery apps), covering more audience in different platforms[75]. Even though the application provides professional tool for the management of marketing ads campaign (as Facebook for Business does), TikTok Ads platform is not available everywhere (unfortunately Italy is not yet on the list of the available countries).

3.3.1 ANALYTICS AND INSIGHTS

TikTok provides interesting tools for the management of analytics and impression to keep on track results of published contents. First of all, to have access to the analytics features for the profile, it is mandatory to switch the account to the pro account. In this way, the profile unlocks the possibility to log into insights features. The analytic section is composed by three subsections:

1. Overview: it shows the overall trend by 7-28 days. Again, divided in:
    a. Video Views
    b. Followers Trend
    c. Profile Views
2. Content: it shows the overall number of contents posted. Divided in:
    a. Total number of public and private posted videos.

[75] TikTok. (n.d.). Advertising on TikTok Ads. Retrieved from TikTok Help Center: https://ads.tiktok.com/help/article?aid=6667447877242978309

b. Best 9 videos in the last 7 days

3. Followers: it shows an overall panoramic of the audience

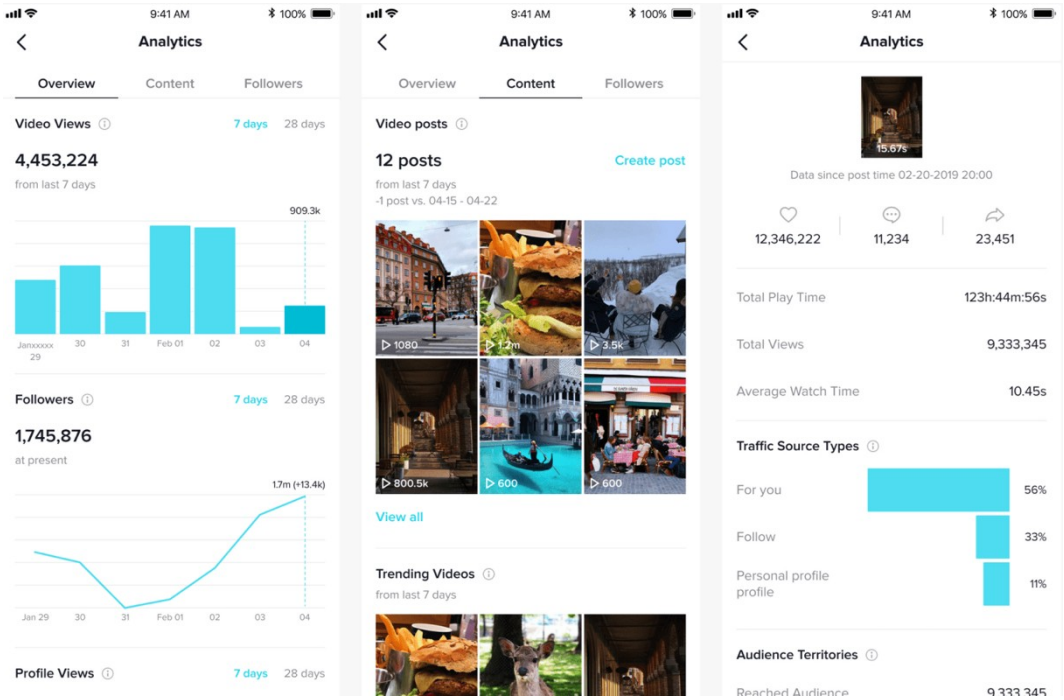
   a. Gender (Male/Female)

   b. Location

   c. Activity of followers

Through this section, marketers or the creators can keep records of the performance trends of their contents, analyze the audience and provide the right content in the right moment.

Figure 19: ANALYTICS SECTION UI

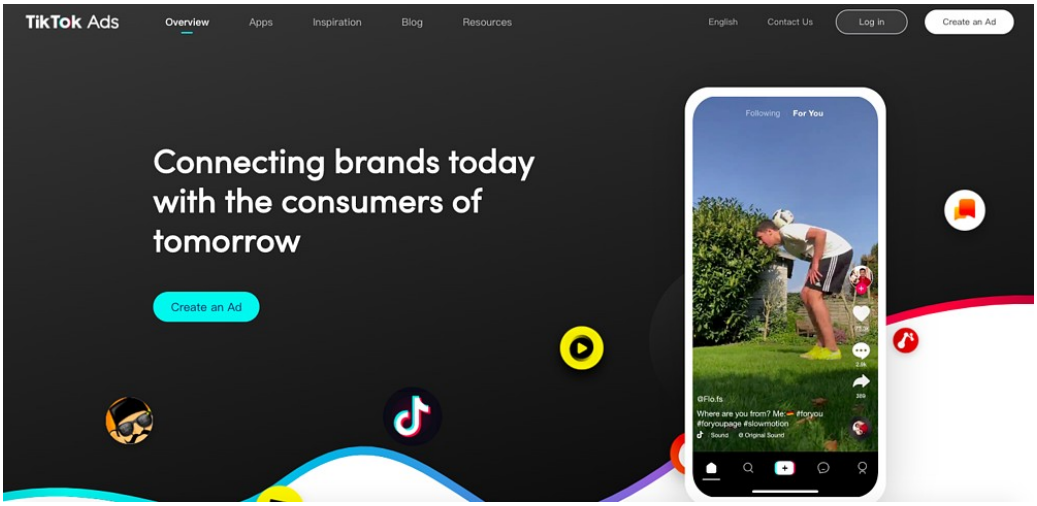


[Source: TikTok Blog]

3.3.2 TIKTOK ADS PLATFORM

With regards of the advertising, TikTok provides to marketers and businesses the TikTok Ads Platform for the creation and the management of ads campaign and more. Since the entire procedure is not still available in Italy (generally in all Europe), the Influencer Marketing Hub team provided the general guidelines for the creation of a TikTok advertising campaign.[76] First of all, to enter into the advertise platform, it is necessary to create a TikTok Ads account [77], by accessing the desktop website "TikTok Ads Homepage" and click "Create an AD".

Figure 20: TIKTOK ADS DESKTOP PAGE

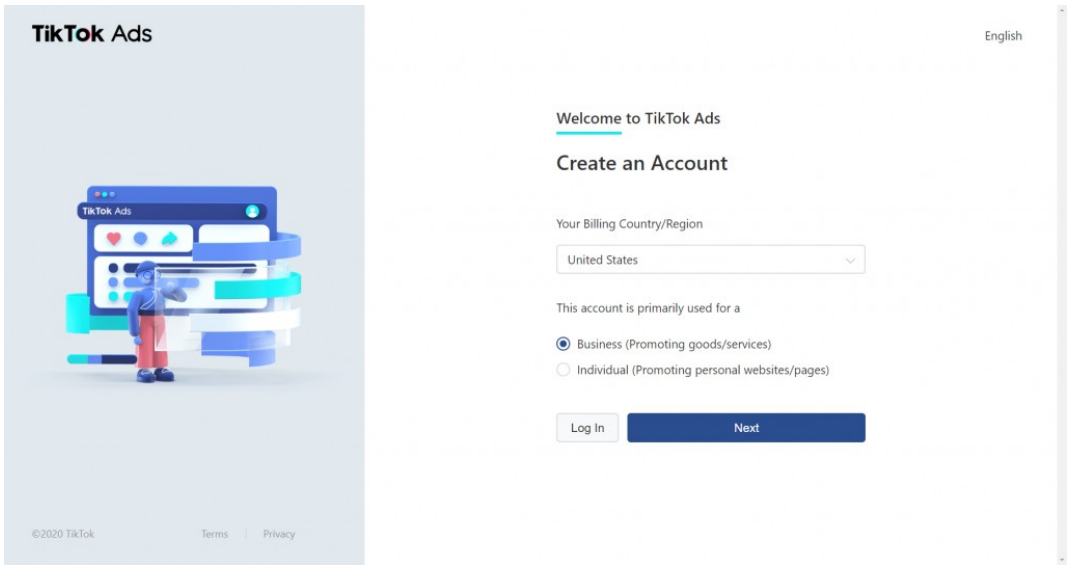


[Source: TikTok Ads]

[76] Influencer Marketing Hub. (2020, June). How TikTok Ads Work. Retrieved from Influencer Marketing Hub: https://influencermarketinghub.com/tiktok-ads/

[77] In countries where available. India, Vietnam, Japan, Taiwan, Malaysia, Indonesia or Thailand have a direct sign up with the primary TikTok account.

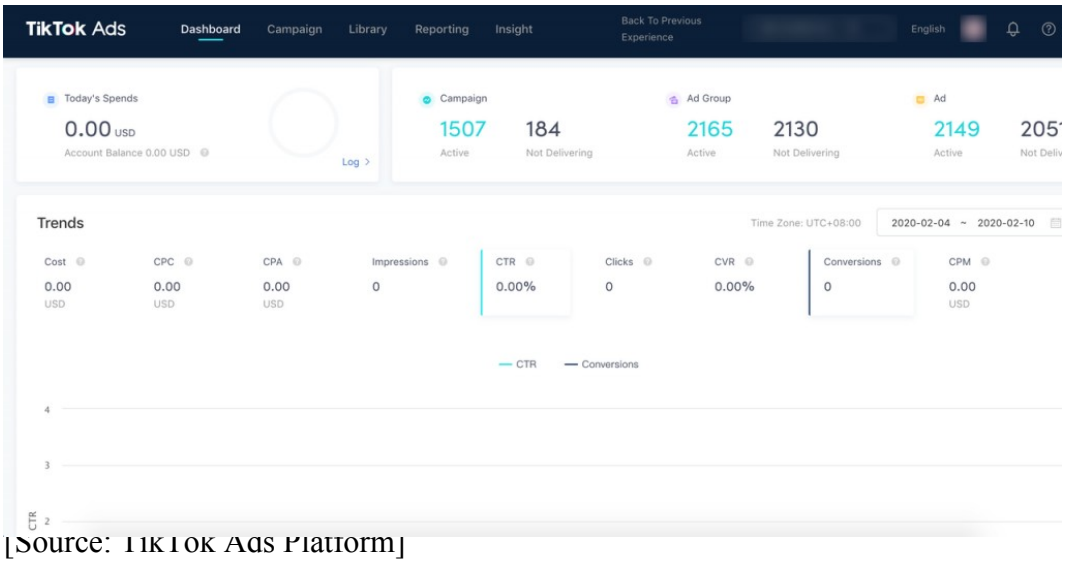
Figure 21: TIKTOK ADS ACCOUNT CREATION FORM



[Source: TikTok Ads Platform]

After the creation of the account for Ads providing details about the individual or commercial use of the account, TikTok will approve the account within few days. With the account approval, now it is possible to create and start an Ad Campaign. The TikTok Ads Platform reminds the popular Facebook Business Ads platform, with several sections such as Dashboard, Campaign, Library and more. The dashboard provides a general overview of the all activities including campaign, ad groups and ad. Furthermore, it shows trends with metrics of cost, CPC, CPA, CTR, CVR, CPM, impressions, clicks and conversions with the possibility to filter the period of analysis of data trends.

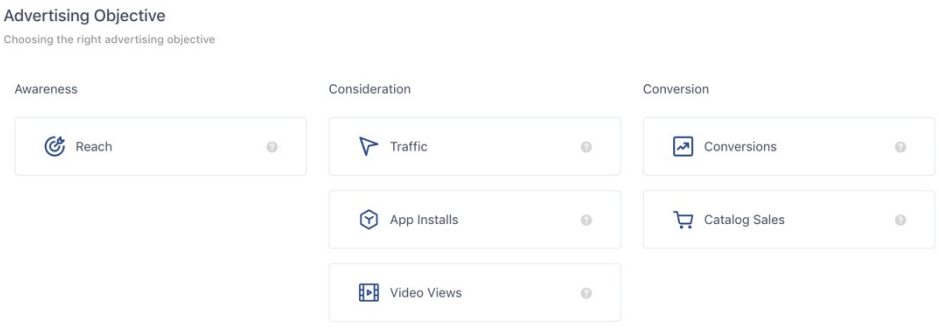
Figure 22: TIKTOK ADS DASHBOARD



[Source: TikTok Ads Platform]

Moving forward, the section Campaign allows to create an Ad campaign and in the first instance to choose the campaign goal among Traffic, Conversions and App Install.

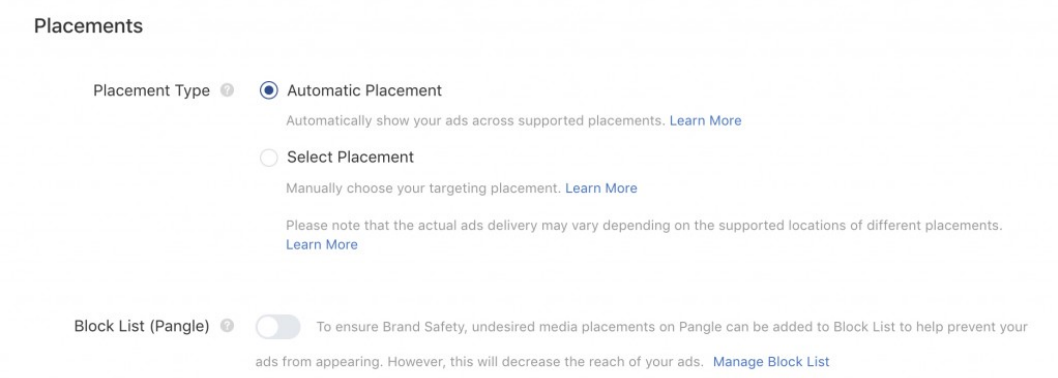
Figure 23: TIKTOK ADS CREATION



[Source: TikTok Ads Platform]

Once selected the advertising objective and the ad, the platform lets user set the ad group by choosing more details such as placement, target audience, budget, schedule and more. As said before, the advertising is available for the family network of applications owned by ByteDance; in this section it is possible to extend or limit the placement of the ads in the platforms with an automatic placement or with a selected one.

Figure 24: TIKTOK ADS PLACEMENT

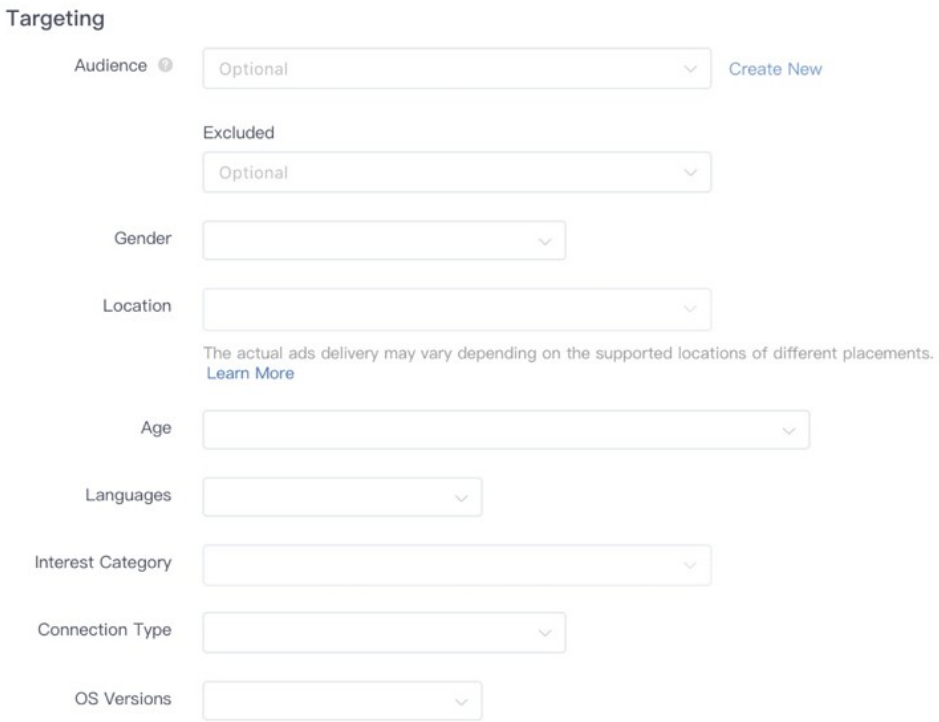


[Source: TikTok Ads Platform]

The next step is the setting of the Ads Details including the promotion type of the ads, profile image, category, tags, keyword and so on. Moving forward, the targeting section allows to sharpen up the target audience for the ads. The fillable parameters are gender, location, age, language, interest category, connection type

and OS version. As available for Facebook Business Ads platform, it is possible to upload a custom audience for remarketing campaigns in the list of user IDs in csv, txt, zip or through the adoption of the TikTok Pixel.[78]

Figure 25: TIKTOK ADS TARGETING



[Source: TikTok Ads Platform]

This powerful tool (as the well-known Facebook Pixel) tracks actions of a visitor in the page or website. Through an HTML code embedded into the website,

[78] TikTok. (n.d.). About TikTok Pixel. Retrieved from TikTok Help Center: https://ads.tiktok.com/help/article?aid=6669727593823993861

it is possible to load all the behaviors of the visitors and, with the aid of the advertising, provide a very targeted ads for the user on the platform. As the official website reports, TikTok pixel helps data marketers to better understand the visit and the actions to:

- Measure campaign performance, including ads and conversion for a specific event defined.
- Optimize the delivery of the ad by setting the optimization on a specific goal to target users most likely to do a certain action
- Building groups of audience by behavior useful for strategies of remarketing

After the selection of the target audience, the Budget and Schedule section set the amount of budget and the duration of the ad group. Then, the user can set an optimization goal such as:

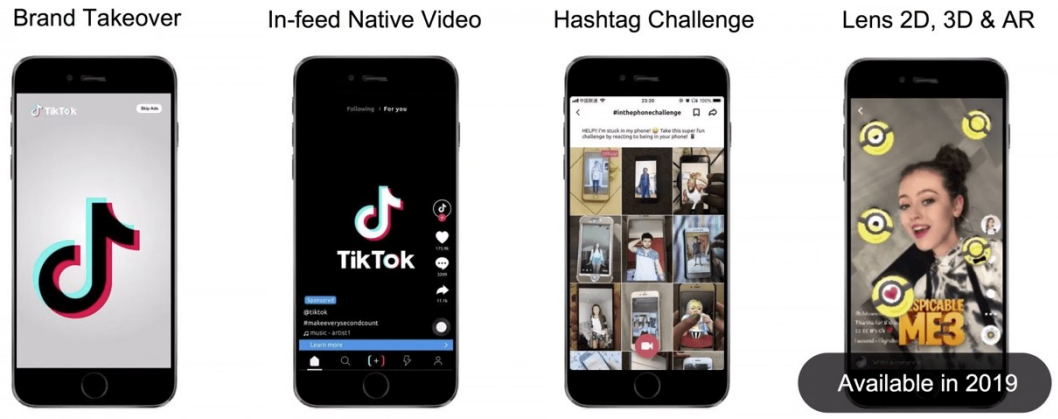
- Conversion: ad shown to an audience most likely to be converted in the decided action. The payment measure for this optimization is oCPC (Optimized Cost-Per-Click).
- Click: ad shown to attract clicks. The cost is based on Cost per Click (CPC)
- Impression: ad will appear maximizing views as much as possible and the user will be charged with cost per thousand (CPM) method.

Finally, the last step is the creation of design of the ads. TikTok is equipped with the ability to create different format of ads in vertical, horizontal and square format.

Furthermore, the Automated Creative Optimization tool allows marketer to create ads uploading images, videos and text with call to actions.[79]

For the creation of advertising, the social network provides five types of advertising formats, each one with different application based on the goal: In-feed Native Videos, Brand Takeover, Hashtag Challenge, Branded Lenses and TopView.

Figure 26: TIKTOK AD FORMATS



[Source: DIGIDAY]

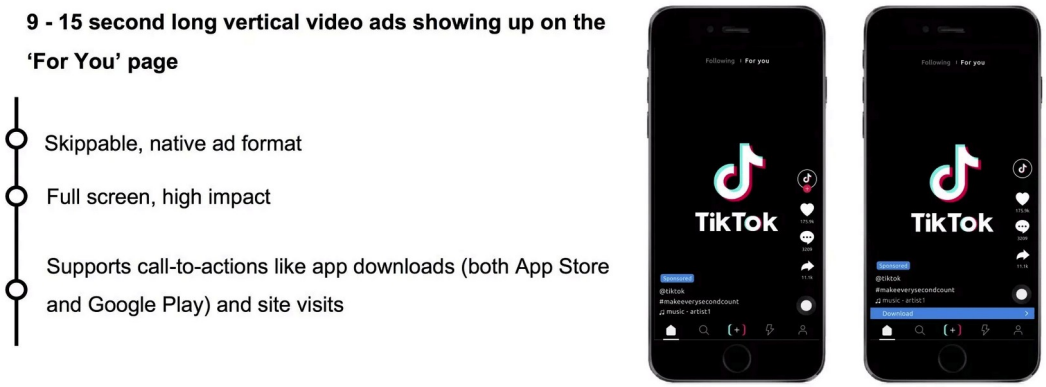
1. IN-FEED NATIVE CONTENTS ADS: they are showed inside the feed (for you page or following section) and when searching hashtags. Their duration is between 9-15 seconds on auto play up to 60, quickly skippable by swiping up to the next video as Instagram stories. Moreover, they are endowed by

[79] TikTok. (n.d.). Automated Creative Optimization. Retrieved from TikTok Help Center: https://ads.tiktok.com/help/article?aid=6670043695674294277

the possibility to add multiple CTAs for example website, app download button, or web redirect to a landing page and more. Users can leave comments, share and follow the profile or even create contents with the same sound.

The available metrics for in-feed native video are impressions, clicks, CTR, total video views, video view time (over 3 seconds, 10 seconds and finish), avg duration video play, video engagement (likes, shares, comments)

Figure 27: IN-FEED NATIVE VIDEO UI



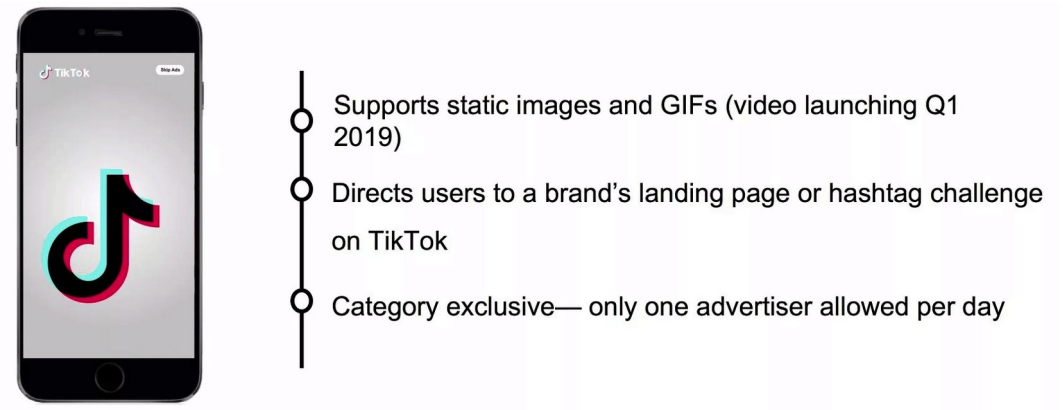
[Source: DIGIDAY]

2. BRAND TAKEOVER: they are showed full screen at the launch of the application after the splash screen, they are typically short ads of the duration of 3-5 seconds long. This type of advertising can contribute to the increase of the brand awareness and lead the user to a landing page. The

limitation for this type of ads is very strict since TikTok allows only one brand per day per country

The available metrics for brand takeovers are impressions, clicks and unique reach.

Figure 28: BRAND TAKEOVER UI

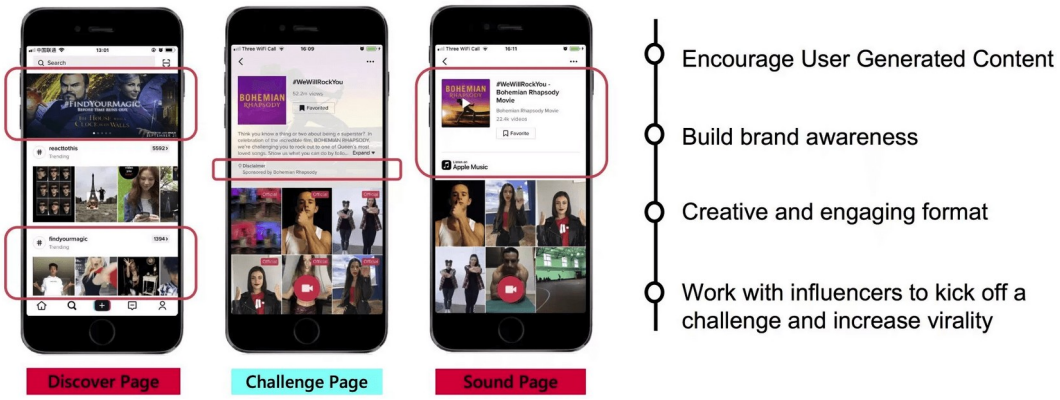


[Source: DIGIDAY]

3. BRANDED HASHTAG CHALLENGE: TikTok allows brands or creators to obtain a branded banner for the use of a particular hashtag challenge. This is translated to an enhanced visibility of the brand into the hashtag search box for six days, accompanied with a particular guideline for the challenge linked to the hashtag. Influencers and users can share contents with the same hashtag, not only encouraging user generated content but also increasing

brand awareness for business purposes. There is the possibility to set 3 to 6 days to support media placement, creative guidance with a seamless setup. The available metrics for hashtag challenges are banner views and clicks, hashtag page views, number of user-generated videos, view views, video engagement and number of using user branded music.

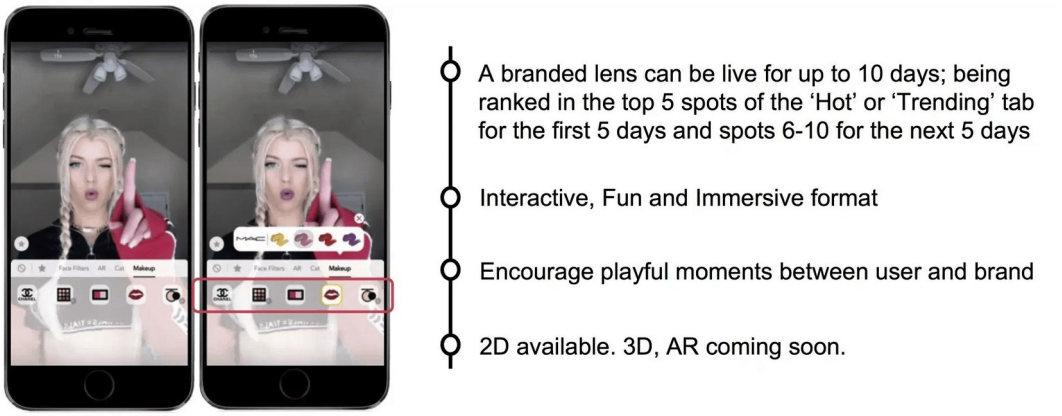
Figure 29: HASHTAG CHALLENGE UI



[Source: DIGIDAY]

4. BRANDED LENSES: it is possible to create 2d/3d filters with or without facial recognition through the AR (augmented reality). The use of this feature allows user to test, for example, products before launch or understand in advance what color users mostly prefer.

Figure 30: BRANDED LENSES UI



[Source: DIGIDAY]

5. TOPVIEW: As mentioned before, it is also present an experimental TopView format, very similar to branded takeover which allows to have a similar layout of in-feed native contents ads. The video lasts up to 60 seconds in auto-play with sound, covering the entire screen.

Figure 31: OVERVIEW OF ADS MEASUREMENT METRICS

[Source: DIGIDAY]

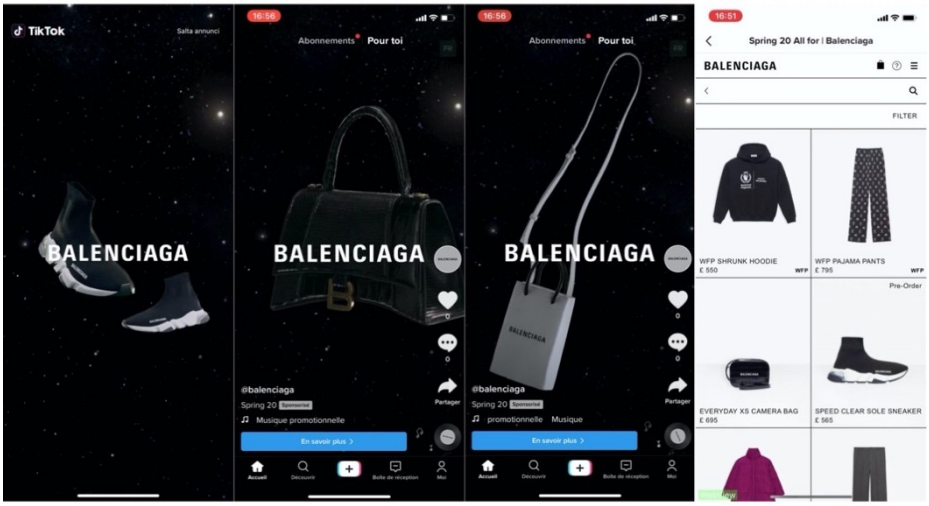
In view of the above, it is evident that TikTok provides exclusive brand-new formats for advertising, nothing ever seen in other social networks. For this reason, the competition inside the ads platform is still weak and exclusive, and this allows ad buyers to have lower CPMs with respect of similar ads platform. Marketers can exploit this momentum to create high quality level advertising and in the same reducing bidding cost for their ads.

3.3.3 INSPIRATIONAL STORIES

An additional interesting section provided by TikTok for business is Inspirational Stories, a showcase with the most relevant successful cases of business companies that collaborated with TikTok. This hub lets marketers discover how relevant brands were helped by the platform to achieve their marketing goal. The access is free, and the section allows to filter the search by industry, ad product and by market (country). In this way, marketers can take inspiration by these successful stories for their business. Marketers can explore this section by filtering industries, format type of Ad Products and Markets. Every case shows performances of the ad campaign by firstly describing the objective, the solution and the results. From real business cases, companies can take inspiration for their businesses and replicate or be inspired for their digital strategy. The following lines will highlight some relevant analytic insights from real business ads stories from popular brands:

BALENCIAGA: The first objective of the campaign was to raise the brand awareness of the brand seeking for new audience on this platform, using TopView and Brand Takeover format ads. The campaign launched under Christmas time in UK and France with the TopView ad was successful so that it includes new format of advertising with Brand Takeover. The layout was minimal but catchy, the urban wear style was respected in the graphic settings. The CTA adopted for this campaign was "discover more" with a redirecting to a landing page with the Spring 20 collection. The result of the campaign was a real success:

- more that **23M+** total impressions in UK, France and Italy,
- average Click-Through Rate **18%**, **20.56%** Italy
- total video views **25M+**
- **4.5M** Clicks on the landing page

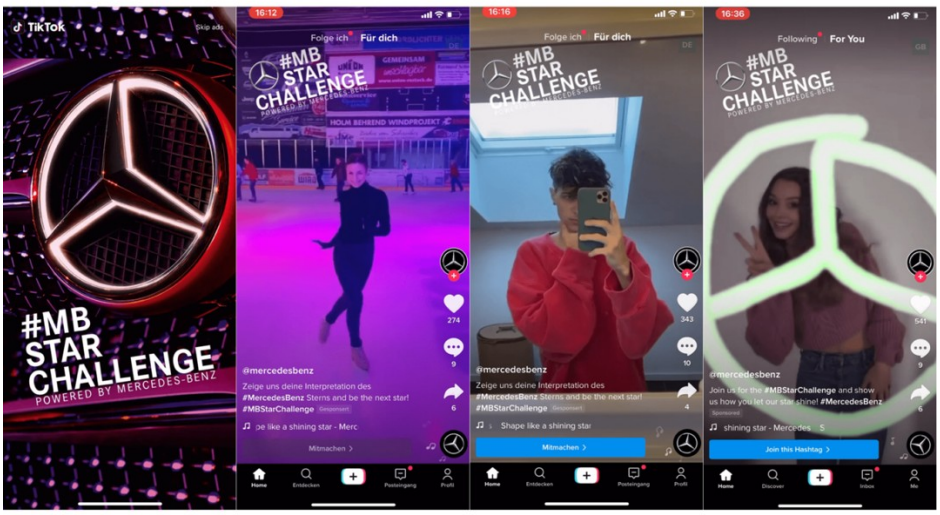


[Source: TikTok Inspirational Stories]

MERCEDES BENZ: The objective of the marketing campaign was to increase brand awareness among Gen Z and Millennials in UK and Germany markets. Mercedes launched a hashtag challenge #MBStarChallenge, including a brand-new soundtrack, to encourage users to re-think the logo model of the company with creativity and new moods. The company also used fresh brand takeover and in-feed video ads to catch user's attention and be inspired in a unique way.

The result of the campaign was a real success, mainly for the amount of UGCs:

- **180M+** video views for **185k+** videos created by **73k** creators
- **30k+** new followers on TikTok
- **1.64M** and **1.4M** page views respectively for UK and Germany
- Click-Through Rate **17.5%**

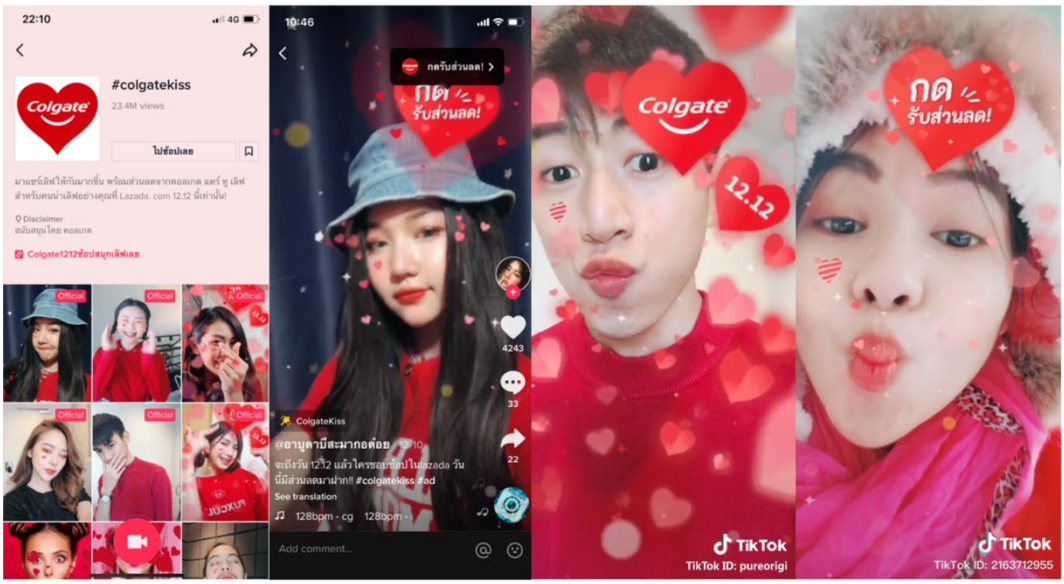


[Source: TikTok Inspirational Stories]

COLGATE: Colgate set the goal of increase sales of a special new toothpaste called “Love” in Southeast Asia. It was launched a hashtag challenge #ColgateKiss in Thailand, including also a branded lens full of branded beating hearts. These were embedded with a CTA that redirected users to the product’s landing page for the purchase.

The result of the campaign led to:

- **43k** submissions of the Branded Effect
- **42k** creators involved on the challenge with nearly **63k** videos created
- **764k** click-throughs for the landing page
- Engagement rate of **4.43%**

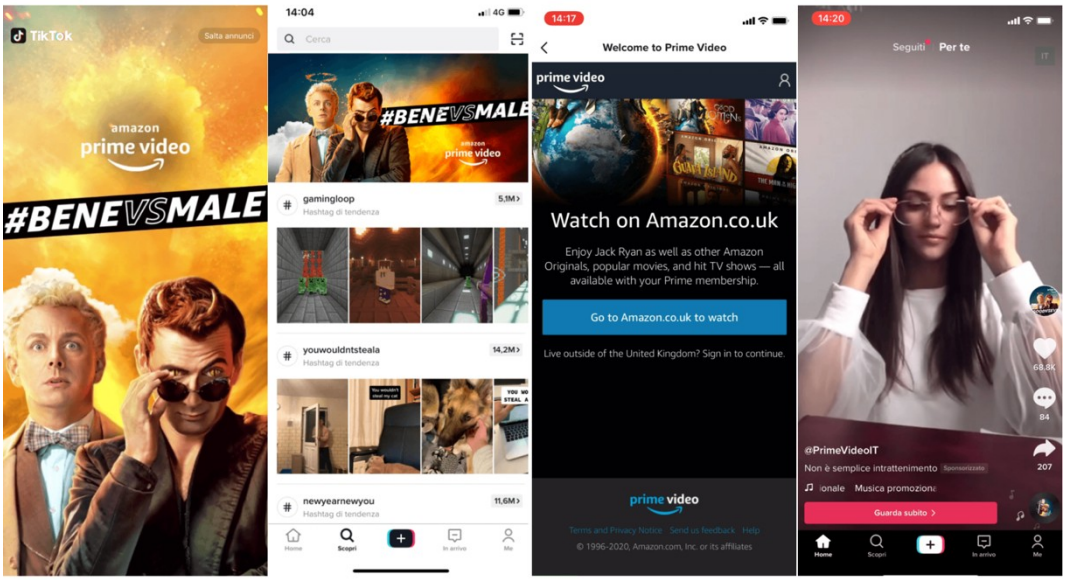


[Source: TikTok Inspirational Stories]

AMAZON PRIME VIDEO: the Italian division of Amazon Prime Video wanted to increase brand awareness among Gen Z audience for the tv shows called Good Omens through the adoption of a hashtag challenge #beneVSmale since the series is based on the battle of good vs evil. Firstly with the Hashtag Challenge that was successful, then with Brand Takeover ad, the campaign obtained great results by the encouraged waves of participants from the young community.

The result of the campaign receives results of:

- More than **68M** views from **51k** videos with **9.4M** of interactions
- **36M** involving **22k** creators for the hashtag challenge

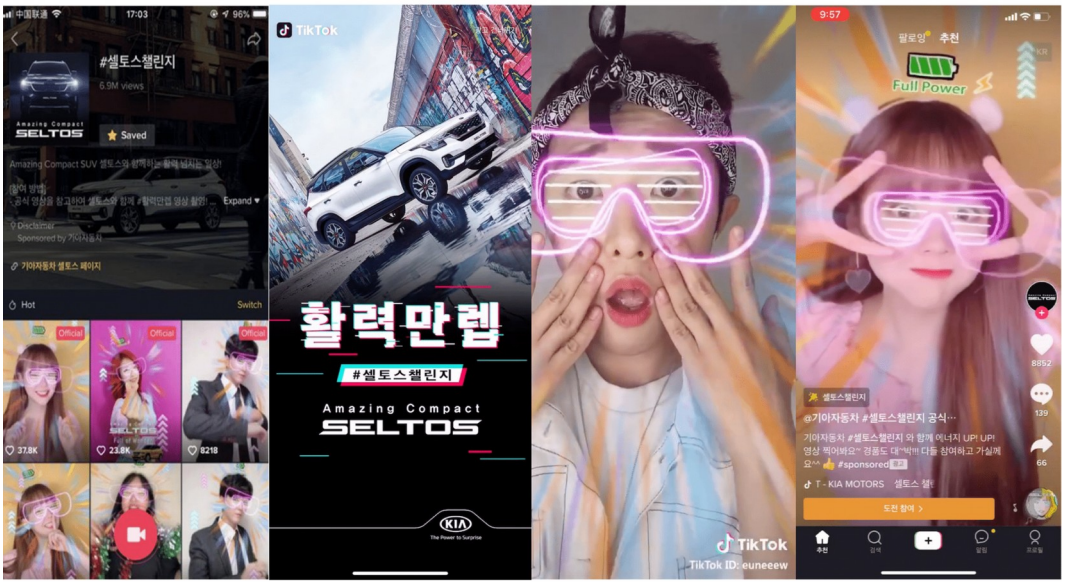


[Source: TikTok Inspirational Stories]

KIA MOTORS: the Korean motor automobile company wanted to reach young generation audience to promote the new compact SUV “Seltos”. They decided to use a Hashtag Challenge and In-feed Video Ads that fully reflected the spirit of the new model: passion, vitality and youth. The hashtag was accompanied by a branded music to be used by users enhanced by a Branded Effect of neon glasses.

The result of the campaign led to:

- **6.8M** video views in 8 days for the official video
- **42k** creators involved on the challenge with nearly **63k** videos created
- **764k** click-throughs for the landing page
- Engagement rate of **6.4%**



[Source: TikTok Inspirational Stories]

3.4 FUTURE OF THE SOCIAL NETWORK

After seeing the potential of application of the platform, we can expect interesting development from this platform in terms of new features for creators and marketers. Surely, ByteDance will continue to massively invest on this application in the next few years, pushing on innovation to deliver a unique social network for entertainment. For example, TikTok many times expressed the interest on the building of a solid music database for its content with acquisition of startup such as Jukedeck[80], for this motivation it is reasonable that in the next years it could become one competitor of Spotify, Apple Music, Amazon Prime Music or YouTube Music.

Moreover, TikTok seems to be interested on the expansion over the streaming platform panorama, after the recent nomination of the Walt Disney Company's top streaming executive Kevin Mayer as CEO of the TikTok and COO of the parent company ByteDance from June 1st 2020.[81] Mayer previously fully followed the development of the new Disney's streaming platform Disney+ and other direct-to- consumer business such as Hulu, ESPN+ and Hotstar.

From the ByteDance's press release, "In his role as COO, Kevin will lead music, gaming, Helo, emerging businesses, and will serve as CEO of TikTok,

[80] Kastrenakes, J. (2019, Jul). TikTok owner may have bought Jukedeck, an AI music startup. Retrieved from The Verge: https://www.theverge.com/2019/7/23/20707371/tiktok-jukedeck-ai-music-startup-acquisition

[81] Barnes, B., & Nicas, J. (2020, May 18). Disney's Head of Streaming Is New TikTok C.E.O. Retrieved from The New York Times: https://www.nytimes.com/2020/05/18/business/media/tiktok-ceo-kevin-mayer.html

leading the rapidly growing platform as it continues to build its global community of creators, users, and brands." [82]

This decision surely outlines the future evolvement of the company, marking possibilities of expansion for music, game and video streaming services.

[82] ByteDance. (2020). ByteDance Names Kevin Mayer Chief Operating Officer. Retrieved from PR Newswire: https://www.prnewswire.com/news-releases/bytedance-names-kevin-mayer-chief-operating-officer-301061108.html

FINDINGS

Considering the analysis made on trends with respect of even more increasing users on the social network, it is presumable and conceivable that the platform will find a relevant place in the panorama of social media. The choice of the case study of ByteDance fully match the precise and right approach for artificial intelligence and machine learning for the business application, a company that since its born created AI-driven platforms such as TikTok.

In a marketing perspective, the social network covers most of the aspects for a competitive advantages as discussed in the second chapter which include being:

- Forecasting Customer's Needs: through the algorithm, ByteDance's platforms, especially TikTok, provide contents to users forecasting what kind of contents they likely could prefer, catalyzing the user's attention and increasing the time spent on them.
- Accurate Marketing Campaign Optimization: TikTok provides marketing tools to analyze your audience and target specific ads for them. Moreover, especially for marketers, the use of the TikTok Pixel optimize and make efficient the ad campaign.
- Process Monitoring: the platform provides concrete datasets for the analysis of insights and analytics to keep on track trends. With regards of marketing

aspects, TikTok Ads platform offers tool to monitor ads campaign with specific digital marketing KPIs.

The task automation is an aspect that it is currently unavailable for TikTok, that could be useful to creators for example on the automatic schedule of contents as it happens on Facebook, but it is reasonable that TikTok will follow the competitor's feature in the future. Not only, the social media exploits all the benefits that the propensity model can offer in terms of smart content curation, predictive analytics, ad targeting and retargeting, confirming the full exploitation of the AI potential.

At the "state of art", it is up to marketers exploit in the best effective manner the tools that the platform provides to them. In this sense, marketers should make the most of the so-called pioneer advantage in order to enter into this world while they can before competitors. Obviously, communication and strategies must match the audience and target we are interested in, and entering into a platform such as TikTok, it requires plan and aware decisions to avoid lack of professionalism or even inconsistency. The concrete evidence is that at the current state TikTok is a powerful platform not for everyone or at least in part. As seen from inspirational stories section, in the platform mainly B2C companies found applications and results and, for some aspects, it is still premature to use the social network for advertising purposes in the same exact manner marketers do with Facebook or Instagram because the audience, although diversified for every groups of age, refers mainly to young generation (Gen Z and Millennials as seen in the previous section).

The matter is different with respect of visibility, promotion and brand awareness, sometimes even leads generation. Indeed, companies and brands that started the TikTok journey with the ads platform used the social network mainly to introduce new products or to raise the brand awareness of it or of the whole company to young generations obtaining incredible impressions from analytics. This confirm that the audience distribution not necessarily impedes a digital strategy planning on TikTok, and entrepreneurs should rethink their strategy adopting different communication and tone of voice suitable and tailored for the platform understanding the target through the building for example of a buyer persona. Surely, with regards of industries, companies operating in entertainment, design, fashion, everything is inherent in graphics, or wearable will surely find advantages on the contents creation because of the simplicity to promote the product or service due to the nature of them. The biggest mistake businesses can make is to consider TikTok like other social networks: if Facebook addressed to a wide audience through the development of a network/hub of contacts, single user and companies, Instagram has moved further towards the enhancement of graphic content marketing and higher visual quality of impact. TikTok has done another step again, trying to go further by focusing on the emotional approach of involvement, virality, community first approach, co-creation between users and development of a valuable customer experience enhanced by AI. This make TikTok an unique and potential platform to take into account in the current and future panorama of social media networks.

CONCLUSION

Artificial Intelligence and Machine Learning will be main characters for the next decades, revolting the way we are habitual to live and work. In the course of the paper, historical aspects were addressed to understand the starting point and the evolution of artificial intelligence.

The focus subsequently moved to the relevant applications of machine learning tools and propensity models aspects in the business world, particularly in the marketing context providing relevant and modern frameworks. By changing the tools of strategy creation, the approach to the customer journey changes with new ideas and ways to guide the customer towards purchasing and retention over time.

Finally, the ByteDance case study and its popular social network TikTok was chosen and discussed, which is booming among the youngest generations and beyond. The analysis focused on its history, on the data obtained in so few years and on the functioning of its algorithm which leads to the virality of the contents. A platform that prefers and rewards user generated contents finds interesting and inspirational applications in the marketing landscape, with digital tools for the development of a digital strategy for creators and companies.

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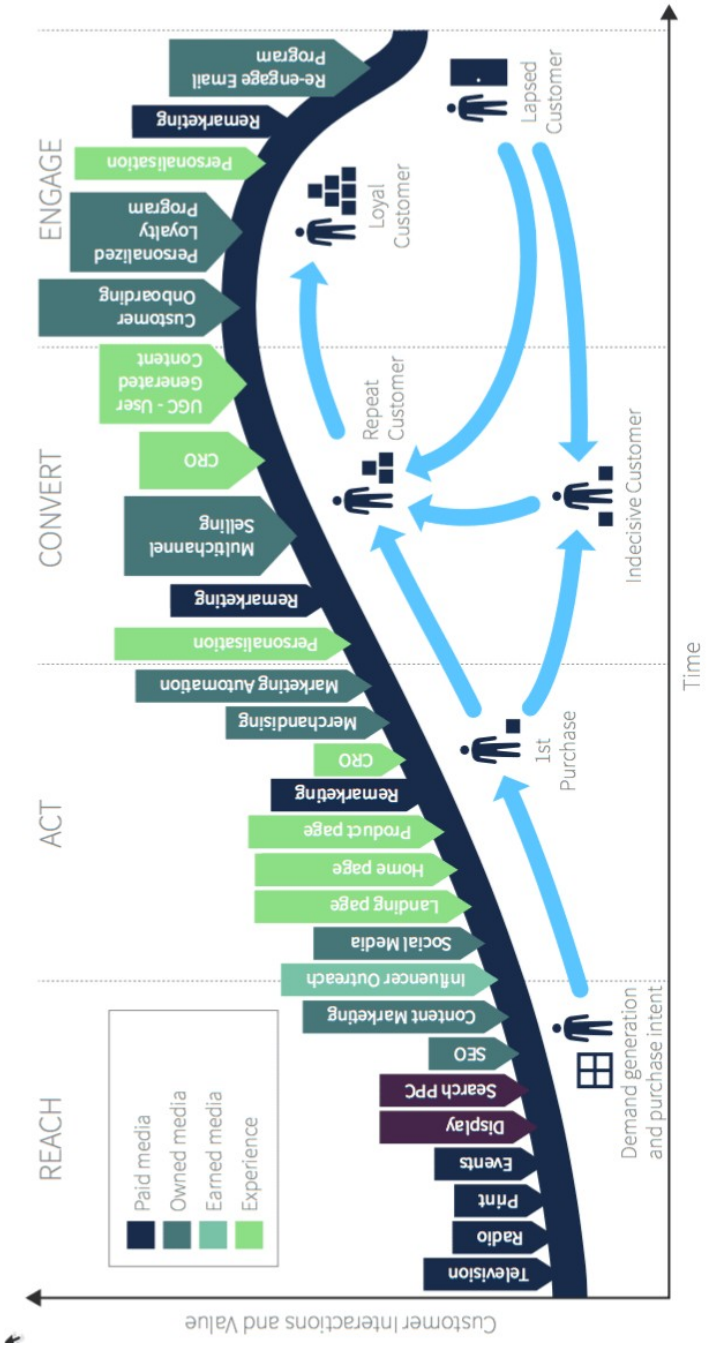
TABLE OF FIGURES

APPENDIX: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ACT
CONVERT
ENGAGE
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Owned media
Earned media
Experience
Television
Radio
Print
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SEO
Content Marketing
Influencer Outreach
Social Media
Landing page
Home page
Product page
Remarketing
CRO
Merchandising
Marketing Automation
Personalisation
Remarketing
Multichannel Selling
CRO
UGC - User Generated Content
Customer Onboarding
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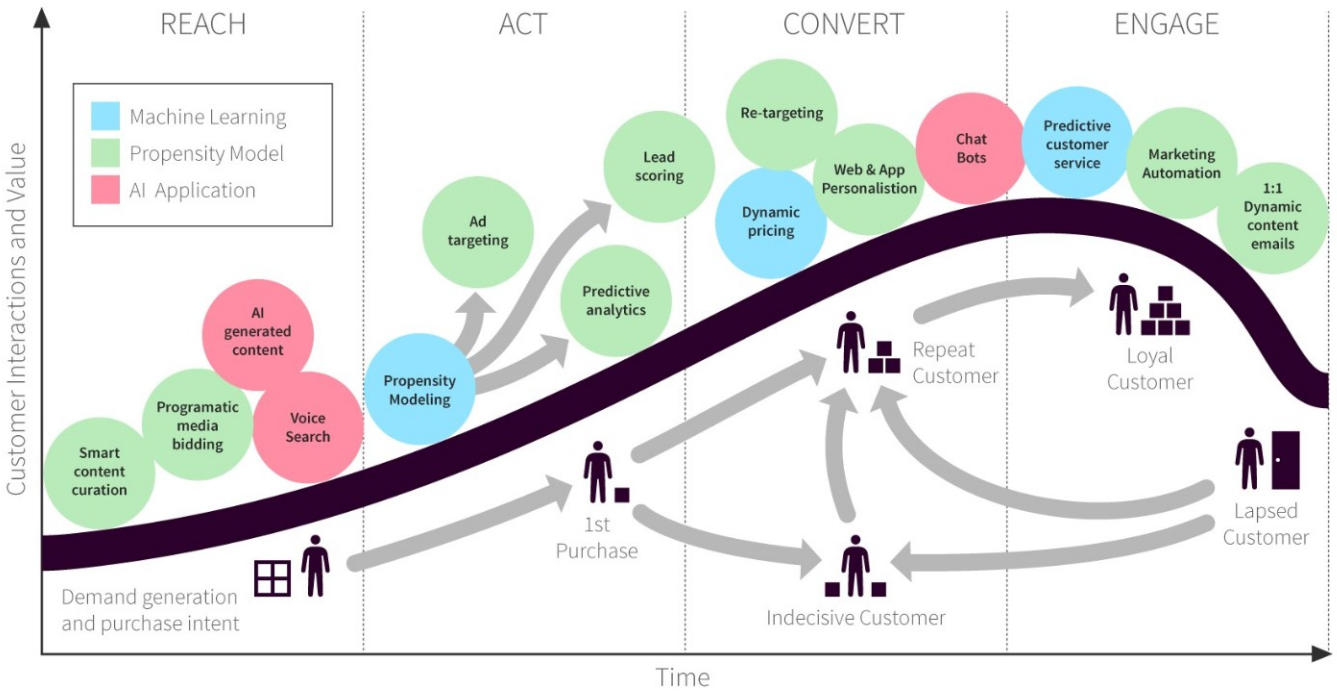
1st Purchase
Repeat Customer
Loyal Customer
Indecisive Customer
Lapsed Customer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Programatic media bidding
AI generated content
Voice Search
Propensity Modeling
Ad targeting
Lead scoring
Predictive analytics
Re-targeting
Dynamic pricing
Web & App Personalistion
Chat Bots
Predictive customer service
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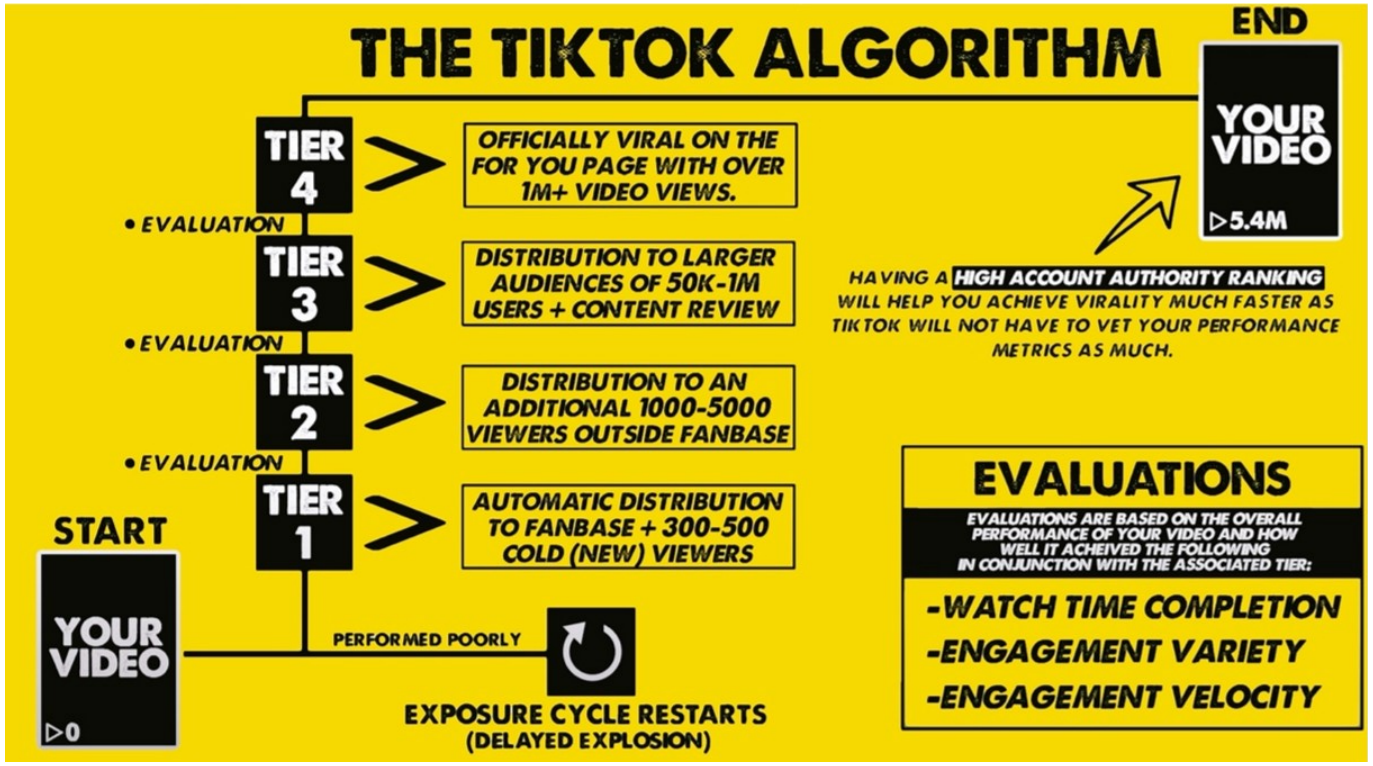
1st Purchase
Repeat Customer
Indecisive Customer
Loyal Customer
Lapsed Customer


THE TIKTOK ALGORITHM
END
YOUR VIDEO
▷5.4M
TIER 4
OFFICIALLY VIRAL ON THE FOR YOU PAGE WITH OVER 1M+ VIDEO VIEWS.
• EVALUATION
TIER 3
DISTRIBUTION TO LARGER AUDIENCES OF 50K-1M USERS + CONTENT REVIEW
• EVALUATION
TIER 2
DISTRIBUTION TO AN ADDITIONAL 1000-5000 VIEWERS OUTSIDE FANBASE
• EVALUATION
TIER 1
AUTOMATIC DISTRIBUTION TO FANBASE + 300-500 COLD (NEW) VIEWERS
HAVING A HIGH ACCOUNT AUTHORITY RANKING WILL HELP YOU ACHIEVE VIRALITY MUCH FASTER AS TIKTOK WILL NOT HAVE TO VET YOUR PERFORMANCE METRICS AS MUCH.
START
YOUR VIDEO
▷0
PERFORMED POORLY
EXPOSURE CYCLE RESTARTS
(DELAYED EXPLOSION)
EVALUATIONS
EVALUATIONS ARE BASED ON THE OVERALL PERFORMANCE OF YOUR VIDEO AND HOW WELL IT ACHEIVED THE FOLLOWING IN CONJUNCTION WITH THE ASSOCIATED TIER:
-WATCH TIME COMPLETION
-ENGAGEMENT VARIETY
-ENGAGEMENT VELOCITY