

## Preface

Colloquially, the term “artificial intelligence” (AI) is used to describe machines/computers that mimic “cognitive” functions which humans associate with other human minds, such as “learning” and “problem solving”. AI can be classified into three different types of systems: analytical, human-inspired, and humanized artificial intelligence. Analytical AI has only characteristics consistent with cognitive intelligence; generating cognitive representation of the world and using learning based on past experience to inform future decisions. Human-inspired AI has elements from cognitive and emotional intelligence; understanding human emotions, in addition to cognitive elements, and considering them in their decision making. Humanized AI shows characteristics of all types of competencies (i.e., cognitive, emotional, and social intelligence), is able to be self-conscious and is self-aware in interactions with others.

AI was founded as an academic discipline in 1956, and for most of its history AI research has been divided into subfields based on technical considerations, such as particular goals (e.g., “robotics” or “machine learning”), the use of particular tools (e.g., “logic” or artificial neural networks), or deep philosophical differences. Subfields have also been based on social factors such as particular institutions or the work of particular researchers. The objective of this publication is to provide a wide variety of topics as they pertain to AI applications within the context of international business in one collective source. We believe this effort will impact the field of international business and trade because there is scant extant literature on AI as it pertains to that field.

AI has become one of the fastest growing technologies in recent years. In fact, technology research giant International Data Corporation (IDC) expects the global AI market size to quadruple to reach approximately US\$58 billion by 2021. AI is positioned at the core of the next generation of software technologies in the market, and technology giants such as Google, IBM, Microsoft, and other leading players have actively implemented AI as a crucial part of their technologies.

Chapter 1 examines how artificial intelligence is defined and classified, illustrating its potential for the marketing domain with a variety of examples from various industries and sectors. Ethical concerns arising from the application of AI marketing will be discussed in the second part of this chapter. Before concluding, three brief case studies will give further insights, looking in detail at the AI activities of AIRbnb, NYC’s Metropolitan Museum of ARTificial intelligence, and retAIL giant Walmart.

Chapter 2 has two research aims: The first is to evaluate how an airport app is having a direct and positive influence on passengers’ sense of security-control. The second is to analyse how this tool can improve passengers’ satisfaction and their perceived image of an airport. A total of 103 passenger-users were surveyed to analyse the influence an app has on passengers-users at airports. The results are particularly relevant for passengers as they are more efficient during their leisure time in terminals, and their stress levels decreases.

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Chapter 3 describes an architecture for reinforcement learning in social media marketing. The rule bases used for action selection within the architecture build upon many-valued (fuzzy) logic. Action evaluation and internal learning is based on neural network-like structures. In using variables measuring the effect of advertising, we must understand direction of influence between advertiser, owning the content of the advertisement, and advertisee, as the target of an advertisement, and as facilitated by social media marketing. Examples are drawn from Facebook marketing.

Chapter 4 demonstrates how to enable marketing managers to gain basic knowledge of the capabilities of the latest data management technology - Big Data - which has the potential of digitally storing huge amounts of data, processing and utilizing the results of processing different types of data, as well as data of different formats in real-time. Due to the enormous potential of implementing Big Data there are also tremendous expectations in terms of the direct financial benefits of its implementation. Realizing all these expectations is a very complex task, which is set to marketing and other managers. The knowledge and skills of managers acquired by education will greatly help to understand the benefits of faster adoption and implementation of new data management paradigms. This chapter emphasizes the differences between the Big Data concept and conventional data processing technologies, as well as the benefits and potentials that this concept offers, especially when it comes to the process of making quick marketing decisions or making decisions in a reasonably short time.

Chapter 5 investigates how technologies are changing marketing due to the amount of information available to consumers, along with information being generated by consumers. Marketers face a challenge with greater volume and variety of data generated at a faster rate than ever before along with fragmentation of channels. This data, when combined with artificial intelligence, presents an opportunity to marketers to provide value add at a granular level and a personalized customer experience around the clock 24/7/365. Treating customers as individuals by offering an optimized personalized offering, sending the right personalized message at the right time through their preferred channel is the promise of data fed into AI algorithms. Artificial intelligence has the potential to transform companies by making sense out of an insanely voluminous variety of data being generated with its ability to serve customers more effectively and efficiently, personalizing at scale.

Chapter 6 examines the influence of AI on disintermediation in the tourism industry. It investigates the changes and transformation of the value creation process and marketing in the tourism industry affected by AI technology. AI could transform and revolutionize every segment of the tourism industry. Thus, it can make tourism more efficient with new value-added customer services. AI is considered an enabling tool for the creation of the so-called “smart tourism” as a new age of tourism development. As a digital tool, AI enables the tourism industry to get insight into the customer, understand tourist profiles and provide consumers with personalized and niche travel experiences.

Chapter 7 analyses AI, robots, and human decision-making process together with the role of automatic decision-making algorithms in our business systems. It considers critical questions regarding global regulation, ethical standards, public interest and democracy. It examines the need for regulation in digital capitalism. Finally, it outlines the model ‘Business Intelligence Culture’ (B.I.C) and ‘Collective Will Democracy’ (C.W.D) as methodological tools to analyze humans and robots’ governance in the digital era.

Chapter 8 introduces the concept of economic AI literacy as a source of competitive advantage in a world where Artificial Intelligence (AI) complements and transforms business models. The purpose of economic AI literacy is to allow for enhanced strategic decision making in firms that either offer and/or use AI. Data and information goods, economics of networks, and economic agents in Artificially Intelligent Firms are introduced as basic elements of economic AI literacy. To illustrate application, the

case of TensorFlow and related cases are presented. The discussion highlights the strategic relevance of economic reasoning in the light of the expected effects of AI on business transformation.

Chapter 9 considers finance in the world of AI and digitalization with a special focus on the role and physical forms of money throughout history, modes of executing financial transactions, development of banking and investment industry and its overall importance for financial management. Innovative and alternative business solutions in the financial industry result from the development of modern technologies, information and communication networks, smart devices and various applications. Digital money and cryptocurrencies are extremely interesting current phenomena producing a broad range of speculations and mystery about their role in the future. Electronic payments bring many benefits and opportunities for corporate finance, capital markets, and investment and banking activities. Digitalization of business operations and use of artificial intelligence applications increases competitiveness and efficiency of all controlling processes and improves corporate risk management and at the same time decreases information asymmetry in the market.

Chapter 10 deals with possibilities of using fuzzy logic in the process of selecting stocks for the portfolio. Often investors observe specific cognitive uncertainty problems within the portfolio selection. This is where fuzzy logic can help with the final decision. After the description of the selected fuzzy logic concepts and comparison with other similar approaches, an empirical section provides detailed insights into the applications of such methodology. The analysis utilizes weekly data for the period January, 2018 – April, 2019 for 20 selected stocks in order to exhibit the usefulness of the observed approach in the portfolio selection.

Chapter 11 discusses Business Intelligence (BI) highlighting its general strengths, weaknesses and opportunities in the organizational context and in the context of unstructured data. Initially, a brief background on BI was discussed, followed by the discussion on benefit and challenges in different context. Recommendations provided for the challenges discussed. Later, the chapter further examines BI and AI and the future outlook of BI. The contents of this chapter will help theoretically to understand BI, its background, benefits and challenges, and how to deal with the challenges by the given recommendations. Practically, this chapter will give insight to organizations about challenges to think about earlier stage based on the discussion on challenges in the organizational context.

Chapter 12 seeks to show how AI has emerged with a portfolio of solutions applicable to supply chain management, some of which are still under development but are aimed at simplifying and automating these processes. The chapter will define these concepts, then show the different applications that AI has in the management of the supply chain. The conclusion highlights future challenges supply chains will face and that can be solved with the use of innovative and disruptive technologies.

Chapter 13 provides empirical evidence on the relationship between AI and relocation, exploring how AI is related to both the offshoring and backshoring strategies using data from an international sample of 124 German and Italian manufacturing companies. Following the investigation of AI use by German and Italian manufacturing companies, the study analyses the differences in some strategic factors and the offshoring and backshoring decisions between German and Italian companies, AI users and non-users, and between the German and Italian AI users. Results show the most important differences concern AI users and non-users and indicate a higher value of AI use for backshoring rather than offshoring strategies. The findings enable the derivation of both theoretical and managerial contributions.

Chapter 14 gives an overview of different types of electronic negotiation, most recent advances in that area, some challenges in electronic negotiation, and interaction between humans and agents in negotiation. Negotiation is one of the basic forms of interpersonal communication, especially important

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in contemporary business. Although we assume that only humans can engage in negotiations, there are many negotiation support systems and software agents designed to assist human negotiators before and during the process. They were developed to overcome human cognitive biases and limited ability to handle information. They can support human negotiators, but also be used in place of humans to conduct negotiations on their own.

Chapter 15 proposed two different methodologies to discover the optimal solution to the balanced and unbalanced intuitionistic fuzzy transportation problems (UBIFTPs). In addition, the parameter of both the balanced and UBIFTPs are considered to be triangular intuitionistic fuzzy numbers (TIFNs). Two new methodologies respectively, method-1 and method-2 are presented in this chapter. Proposed method-1 is based on linear programming technique and proposed method-2 is based on modified distribution method. Both the methodologies are used to solve the balanced and UBIFTPs. The ideas of the proposed methodologies are illustrated with the help of real-life numerical examples. The solutions obtained by the proposed methodologies are checked with some software (e.g. MATLAB, LINGO) and the computer code related to the proposed problems is also given. The unique results, comparative study, discussions and the merits of the proposed methodologies are all given. Future work is mentioned in the conclusion.

Chapter 16 discusses AI as the branch of Computer Science focusing on the creation of intelligent machines that mimic human reasoning and behavior. Probability theory is among the mathematical tools used in AI applications to deal with situations of uncertainty caused by randomness. In particular, the Markov Chain (MC) theory is a smart combination of Probability and Linear Algebra that offers ideal conditions for modelling such situations. International business is about the trade of goods, services, technology, capital and knowledge at a global level, while Decision Making (DM) and Case-Based Reasoning (CBR) are among the processes that are frequently used in this field. In this chapter an absorbing and an ergodic MC model are developed on the steps of DM and CBR respectively for representing mathematically those two processes thus providing valuable information about their evolution. The examples presented are connected to international business applications.

Chapter 17 states the oil & gas industry is in a stage of intense focus on safety, preparing for better management of environmental risks and mitigating them. Given the policy of corporate social responsibility, technical and economic challenges, as well pressures in domain-specific regulations, it has become increasingly obvious that the management of these risks is essential for long-term sustainability of oil and gas companies. Research shows that safety and environmental issues, compliance with regulatory rules, price volatility and rising challenges associated with access to oil and gas reserves and markets are the top risks identified by oil and gas industry executive directors. In this sense, the tools offered by AI can contribute to the proper management of these risks and to the adequate monitoring of all the categories of processes that take place at the level of the optimized production generated by the gas wells, regarding the transport of petroleum products through the pipelines and especially with regards to offshore activities.

Chapter 18 shows a practical end-to-end solution that allows the integration of non invasive location-based marketing advertisements finally binding physical and virtual in-store customer presence. The goal of the solution is to digitalize the business and improve the customer experience with the indoor proximity based iBeacon technology for personalized marketing advertising. The architecture uses cheap battery powered iBeacon devices, Android App and a recommender system for sending non invasive advertisement in the right moment to the right customer. The intelligent combination of loyalty programs, personalized location-based marketing campaigns and connection to existing CRM systems,

will enable the desirable increase in customer loyalty by also creating ideal circumstances for custom omnichannel marketing.

Chapter 19 examines the sovereign rating of India using Principal Component Analysis and Logistic Regression. Against the background that India has been continuously receiving for over a decade the same investment grade of sovereign rating, the authors research the important indicators of sovereign rating and how to predict the probability that the ratio of foreign direct investment to gross domestic product of a country will be above average. They reviewed existing works and detected certain gaps. During the course of plugging these gaps, the authors collected cross section data available on economic, financial and institutional variables of the emerging economies of ASEAN and SAARC members. They applied principal component analysis to distill relatively more effective variables determining sovereign rating and then they applied logistic regression to these variables in order to compute the above probability. The methodology has proved successful in reproducing the past and useful as an internal model of assessing relative sovereign riskiness of an emerging economy among its peers. The work prescribed some policy to improve the aforesaid ratio of India.

Chapter 20 studies the Indian stock market based on commodities. A stock exchange facilitates trading shares of public listed companies. The trading process is operated through two non-separable and mutually supporting segments called as primary and secondary markets, govern by the Security and Exchange Board of India abbreviated as SEBI. The platform which forms and sell the new securities is known as primary market and the platform in which dealings of these previously issued securities is known as secondary market. A Stock or Equity market is the area which facilitate the trading of the public listed security shares in the secondary market and as of today more than 1300 securities are available in the Exchange for trading. The trading process is analyzed using trading ring in earlier days. In our paper, we are trying to focus on analyzing the effect of dollar sell, dollar purchase, and commodities price under the oil & gas group crude oil on Indian stock indices. The authors have also taken the price rates of precious metal gold nutritious egg in various metropolitan cities in the country.

Chapter 21 investigates the impact of Augmented Reality Experiential Marketing (AREM) on tourist experience satisfaction. The chapter adds to the existing body of literature in the area of tourist experience satisfaction and its attributes and the use of augmented reality in the scope of experiential marketing. An experiment using an augmented reality system was conducted which included a sample of 432 tourists who visited a tourist destination in Croatia. The data were tested using Machine Learning methods; namely, the Information Gain (IG) technique, the K-means method, the Weighted K Nearest Neighbor (WKNN) method, and the Linear Regression (LR) method. Findings indicate that augmented reality experiential marketing has a positive impact on tourist experience satisfaction.

Chapter 22 covers convolutional neural networks for real-time eye tracking in interactive applications. Face alignment and eye tracking for interactive applications should be performed with very low latency or users will notice the delay. In this chapter a face alignment method for real-time applications is introduced featuring a convolutional neural network architecture for face and pose alignment. The performance of the novel method is compared to a face alignment algorithm included in the freely available OpenFace toolkit which also focuses on real-time applications. The approach exceeds OpenFace's performance on both our own and the 300W test sets in terms of accuracy and robustness but requires significant parallel processing power, currently provided by the GPU. For the eye tracking application stereo cameras are used as input to determine the position of a user's eyes in three-dimensional space. It does not require synchronized recordings which may contain redundant information and instead, prefers staggered recordings which maximize the number of possible model updates.

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Chapter 23 determines the effects of experiential avoidance, moral avoidance and identity avoidance on brandhate. In addition, this study of brand hate, brand revenge, brand switching intention, electronic negative word of mouth marketing and its effects on brand equity have been tested. The data in this study was obtained from a face-to-face survey with 394 consumers. Cronbach alpha coefficient analysis was used for the reliability of the scales. Factor analysis was used for the validity of the scales. The hypotheses in the study were tested by structural equation analysis. According to the results of the study, it was concluded there is a positive effect of experiential avoidance, identity avoidance and moral avoidance on brand hate. In addition, brand hate has a positive effect on revenge, electronic negative word of mouth marketing, brand switching intention. Finally, brand hate has been found to have a negative impact on overall brand equity.

Chapter 24 investigates the evaluation of LPI values of transitional economy nations with a Grey MCDM model. This study has three objectives. First, there are many publications in the literature on the countries of transition economies. However, there are few publications in the literature on the logistics performance of countries of transition economies. This study analyses the logistics performance of countries of transition economies to fill this research gap. Second, only a few studies on LPI considered the period in calculating LPI values. This study considers the period in LPI calculation by using grey MCDM methods to fill this research gap. Third, this study proposes a new integrated grey MCDM model consisting of grey SWARA and grey MOORA. Both grey methods are more practical compared to other grey methods. Besides, both methods were preferred in this study as they have simpler and less processing steps than other grey MCDM methods. According to the results of grey SWARA, the most important criterion is determined as “Infrastructure (I)” criterion. According to the results of grey MOORA, the country with the best logistics performance has been identified as “Serbia”.

Chapter 25 covers an extremely fast heuristic event-driven job shop scheduler with a new class of extended petri nets. A very fast scheduling system is proposed and experimentally investigated. The system consists of a job shop manager and dynamic models of machines. A schedule is created in the course of a close cooperation with models of the machines that generate driving events for the scheduler. The system is implemented with a new class of extended Petri nets and runs in the environment of the Petri-net tool WINSIM. The scheduler creates a schedule sequentially, without any form of enumerative search. To investigate the scheduler performance, a large number of experiments were conducted with the use of few strategies. Due to a unique mechanism of monitoring of triggering events in the Petri net, the developed scheduler runs at least hundreds of times faster than any known single-processor job shop scheduler.

Chapter 26 discusses innovative ideas that can allow investors and other stakeholders to understand and use accounting data in the light of best AI applications. It provides an overview of the impact of artificial intelligence on accounting and reporting practices. The chapter also discusses the latest developments in the field of AI technology and their implementation in the context of global accounting practices, including accounting systems, financial reporting systems and auditing. In light of globalization and the competitive economy, it has become necessary for investors to evaluate the accounting data necessary to make economic decisions that contribute to the development of their businesses. Nevertheless, many consumers of accounting information are still unable to make effective use of the accounting data presented in the financial statements.

Chapter 27 determines the effect of hedonic and utilitarian consumption motives on consumers purchase intentions on big discount days. The questionnaire form was applied face to face with 621 students at a private university in Istanbul, Turkey between May 5-15, 2019. The obtained data were analyzed

with SPSS 21 and AMOS 24 programs and as a result of the analysis, it was determined that the hedonic and utilitarian consumption motives had a significant effect on consumer's purchase intention on the big discount day. Recent changes and developments in social life affect both the marketing strategies of brands and the consumer behaviors. The big discount days were first implemented in the USA under the name "Black Friday" and it was implemented in Turkey under the "Legend Friday, Legend Days, Super Friday, 11.11.". The big discount days campaigns also changed the consumer's sense of consumption. Together with the changing consumption concept, consumers are looking for psychological and social benefits in addition to the physical benefits in the products they purchase.

Chapter 28 proposes a hybrid evolutionary feature selection approach for solving credit scoring problems subject to constraints. A hybrid scheme combining a filter and wrapper-based approaches is proposed to develop an accurate credit scoring model with a high predictive performance. Initially, the Minimum Redundancy Maximum Relevance algorithm is applied to find an optimal set of features that is mutually and maximally dissimilar and can represent the response variable effectively, allowing for an ordering of features by their importance. Subsequently, an iterative procedure, where supervised machine learning algorithms such as the Logistic Regression and the Linear-Discriminant Analysis are combined with an evolutionary optimization algorithm like the Genetic Algorithm, is applied to choose the feature subset that maximizes an appropriate classification measure according to the predefined features and subject to the predefined constraints. The performance of the proposed method is illustrated using standard credit scoring datasets.

We trust these chapters will provoke additional research into the broad subject of AI and its applications in a variety of fields besides international business and marketing. In fact, a few of the chapters mentioned above involve areas where AI is not yet completely employed but can and should be done in the near future.

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