

## **The fourth industrial revolution's potential influence on marketing education**

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### **Abstract**

*This paper explores the likely influence of the rapidly evolving market disruptors of cognitive computing (to mimic the human brain) and robotics to the marketing educator. A review of the literature suggests inroads in the K-12 area, though sparse when higher education is addressed. This is followed with insights on whether students grasp the likely career paths, and curricular guidance from senior marketing educators from AACSB accredited schools on the emerging field of technology marketing. The challenge for the future-oriented marketing educator is how to weave these disruptors into the triumvirate of our profession – instruction, service/governance and scholarship, all geared to improve the career prospects of our students.*

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## Introduction

Rapid advances in technology, described by some at the fourth industrial revolution, are developed to help improve our lives and replace existing jobs and careers. Is our pedagogy and curriculum strategically aligned with this rapid market change? Whether we are entering the fourth industrial revolution or witnessing an extension of the digital revolution, there is one constant, “too much change in too short a period of time” (Tofler, 1970, p.63).

Transcending advances in the digital space is what some refer to as the Fourth Industrial Revolution is characterized as integration of the physical, digital and biological. Examples include autonomous machine learning, nanotechnology, biotechnology, Internet of Things, 3D printing, robotics, and autonomous vehicles (Schwab, 2016; Wikipedia, 2016). The drivers for these innovations represent the virtual (cognitive computing) and the tangible (robotics).

### ***Cognitive Computing (a.k.a., machine learning, natural language processing)***

New hardware and/or software to improve human decision making by mimicking the human brain (Li et al, 2015; Terdiman, 2014). Recent examples include producing Wimbledon tennis video highlights (bypassing the traditional video editor) and Rocket Fuels’ online sentiment tracker to optimize advertising placement (Mercer, 2017).

### ***Robots***

Show promise in the consumer’s home and office when mated with autonomous self-learning algorithms. A present-day home/business example is the humanoid robot *Pepper* initially designed to read emotions, offered at a \$1,600 base price plus \$200 monthly data and insurance fees (Singh, 2015), attracting high profile corporate interest from well-known companies such as Alibaba and Foxconn Technology (Snyder, 2015), Microsoft (Waring, 2016) and IBM (PR Newswire, 2016).

### ***Purpose of this paper***

The focus and contribution of this paper is to examine the likely influence of cognitive computing and robotics as a paradigm shift in the way we as marketing faculty conduct our business. The challenge is how to incorporate this discontinuous innovation as a beneficial asset to market education.

## Literature Review

### ***Defining Technology***

In the 19<sup>th</sup> century technology was the description or study of the useful arts (Crabb, 1823). A popular definition used by social science scholars is “technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them” Bain (1937). To overcome some of the specificity of existent definitions, we will parsimoniously define technology loosely based on work by Funk (1999) as *to create means to achieve valued goals*. This broad definition allows us to span a technology continuum from low technology (e.g., umbrella, hand-wound powered radios) to high technology (e.g., drones, robots). In other words, technology is not simply the coolest high tech, but any means to achieve a valued goal or outcome.

### ***Insights from Market Leaders***

The absence of published scholarly works on the likely influence of cognitive computing and robotics on the workplace places weight on the opinions of market leaders summarized below.

- The global recruiters Korn and Ferry report that in 5 years 44% of CEOs believe “people may be made largely irrelevant.” (Balakrishnan, 2016).

- The World Bank suggest that 66% of all jobs in developing nations could be replaced by automation (Clifford, 2016).
- Goldman Sachs predict the robot agricultural market will grow to \$240 Billion in 5 years (Belton, 2016).
- From McKinsey & Company, “right now, 51% of job activities could be automated” (Wolff-Mann, 2017).
- PriceWaterhouseCoopers (PwC) suggest that robots could replace 38% of all U.S. jobs by 2030 (Reid, 2017).
- The co-founder of Sun Microsystems, Vinod Khosla, predicts 80% of medical doctors’ jobs would be lost over the next two decades to automated machine learning (Khosla, 2012).

## Discussion

There are many approaches to integrate technology into a marketing curriculum and pedagogical, though contingent on student awareness and a desire to prepare for the future in a meaningful way.

### ***Student Buy-in***

Student interest and a desire to learn more about the influence of technology on their academic preparation and career pathways is central to any technology marketing initiative/s. To investigate student reaction, 20 minutes of an undergraduate Principles of Marketing course class time was devoted to a PowerPoint presentation outlining what market leaders have stated regarding the influence of advanced technology on the employment landscape, and a review of the types of professions robots are likely to dominate in the decades ahead. A week later, the students were given a two-question open-ended survey and asked to return the completed survey a week later. This approach offers students time to reflect on the topic. The introduction was “Assume robots will proliferate in the work-place over the next decade or two” followed with “which three careers would you not consider” and “which three careers would you favourably consider.”

Results in Table 1 suggest that students highlight (when mentioned three or more times) the possible perils of highly repetitive process driven jobs and seem to steer toward people-oriented (customer and stake-holder interactions) professions and those requiring specialized knowledge and decision making. This finding is supported by the non-scholarly literature that suggests avoiding careers that are heavily reliant on repetitiveness, well-defined procedures, physical danger, and required muscle-power (PwC, 2017a). The more technology resilient careers are likely “human touch” types such as arts and entertainment - 22%, agriculture, forestry and fishing - 19%, human health and social work - 17%, and education (PwC, 2017a) as well as customer service that draws on the ‘human touch’ or ‘going that extra mile’ (PwC, 2017b).

**Table 1:**

*Student career preferences in reaction to the proliferation of robots in the workplace (n=28)*

Emphasis	Careers to avoid	Favorable careers
Mentioned $\geq$ 3 times	Truck driver, farmer, secretary, factory assembly line member, accountant, receptionist, sales (takers), truck driver, clerical, security, telemarketing.	IT, software engineer, data scientist, robotics R&D, engineering, nurse, elder care, robot coding, entrepreneur, nurse.
Mentioned < 3 times	Electrical assembler, cashier, customer service, accountant, transportation/ logistics, teachers, chef, lawyer, languages, house-keeping, customer service, tour guide.	Technology repairman, CEO, medicine, law, human care, secondary education, counseling, advertising, healthcare, sales (getters), surgeon, cybernetics, marketing, product design, aviation pilot, politician, financial advisor.

Anecdotal student interest in a technology marketing may evolve as a set of courses for a technology-marketing program, and/or an umbrella structure such as a center for technology marketing. Pedagogical initiatives would dovetail from the use of social media as a student-learning tool to the introduction of robots as teaching aids and perhaps involved in marketing faculty scholarship and service. Perhaps a useful starting point would be to develop a Center for Technology Marketing (CTM) serving as a stepping-stone for the development of all manner of initiatives and opens the door for external funding. Within or without such a center, a specialized one-calendar year duration graduate program is described below as an initial cash generating option that could be implemented swiftly (within 6 months) assuming faculty and institutional support and ready access to qualified instructors.

### **Graduate (MS) Technology Marketing Program**

A description of a specialized Masters degree in Technology Marketing together with Course codes, titles and descriptions were developed and sent for review by senior marketing faculty at the following AACSB accredited schools. University of Denver, HEC Paris, Babson College, James Madison University, Texas State University, Christopher Newport University, and Kansas State University. The responses were mostly very positive together with a variety of suggested improvements. This work-in-progress is presented in Table 2 below (course descriptions available from the authors). To keep the program as state of the art as possible, we also recommend a Technology Marketing Master Guest Lecture Series, or similarly titled guest series.

**Table 2:**

*Suggested course titles and sequence for MS Technology Marketing Program*

<b>Course Codes</b>	<b>Course Titles</b>
TM6601	Importance of Technology Marketing.
TM6602	Integrated Marketing Communications (includes Technology Event Marketing)
TM6603	Professional Selling of Technology.
TM6604	Sales Force Leadership for Technology
TM6605	Project Management.
TM6606	Advanced Professional Selling of Technology
TM6607	Business Negotiation
TM6608	Cloud Computing and Database Marketing
TM6609	Purchasing Policies & Procedures in the Technology Space
TM6610	Marketing Analysis, Decision Making and forecasting for technology Products and Markets.

The case may also be made for an undergraduate major in technology marketing and for the graduate program, whether to open enrolment to any student with an undergraduate degree or have it limited to non-business graduates. The reader will notice a sales bias that is consistent with the professional literature's suggestion that jobs involving high levels of social (emotional) skills will grow in numbers as the fourth industrial revolution takes hold (Gershon, 2017).

#### ***Value for the Instructor and School***

Though robots may serve as instructors, it is perhaps cognitive computing, the non-tangible driver of robot and other technology performance that may evolve as the dominant technology. For example, over a period of eight months, cognitive computing out-performed an expert in cancer detection (Tirrell, 2017) that applied to marketing education together with voice recognition may produce machines able to complete manuscript literature reviews, statistical analysis and manuscript write-ups. Perhaps most exciting is the use of cognitive computing to scan near limitless sources of online information to predict successful career paths, program and curriculum creation and related enhancements such that teaching oriented schools may emerge as state of the art with student success to back up their claims.

#### ***Benefits for the Marketing Educator***

The likely marketing educator benefits are presented in Table 3 that are based on existing knowledge and will likely change over time.

**Table 3:**  
*Expected Marketing Educator Benefits*

<b>Duty</b>	<b>Description</b>
Instruction	A robot might be a teaching assistant able to access relevant news as it relates to the topic at hand, and introduce the essentials of the topic and its literature to the students to enhance student learning and strategically, offer career options that we currently cannot predict due to the fast-paced technology we face.
Service & Governance	Humanoid robots would develop relationships with the various stakeholders. Self-learning algorithms that tap into cloud based information would manage the administrative load of student advising, reply to most emails, texts and telephone calls together with real time access to course and class seat availability, manage student advising; and access to internal faculty databases produce all the necessary documentation for annual evaluation and accreditation purposes. Awareness of local, regional, national and international trends would be very useful for the development of departmental strategy.
Scholarship	Machine learning with cloud based information access would be to assist marketing educators with a paper's literature review (by accessing library databases and the popular press online), methodology, statistical design and appropriate use of statistical methods. This may level the playing field between educators with varying scholarly skills.

### ***Implications for Marketing Educators***

Present-day (high) technology covers a continuum from the virtual to the tangible. Cognitive computing (autonomous self-learning) is the virtual representation of technology that could tap into the wealth of cloud-based data and information will at first replace all the processes faced by marketing educators, such as advising, research assistant (literature reviews and research design and statistical methods) and teaching assistant (grading papers, working with student groups thanks to blazing fast multi-tasking abilities).

The tangible representation of technology is the robot that may 'stand-in' for marketing faculty (e.g., instruction, meetings, tutorials, etc) freeing marketing faculty to focus on critical thinking and creativity serving scholarship, service/governance and instructional initiatives. Robotics may also place a central role as part of the business school's public relations and outreach efforts.

### **Conclusion**

It is not inconceivable that rapid developments in cognitive computing and advanced humanoid (human-like) robots will over the next decade influence much of what the marketing educator does. The essential question "in what way?" can only be guessed at. The historic doom and gloom predictions that ATM machines would replace bank tellers, or high definition TVs would end movie theatres has not come to fruition (yet). Perhaps the most successful perspective on technological developments is to maintain awareness, keep an open mind, and expect a different set of employment and career opportunities for the marketing educator and our students ever aware that people skills are the most difficult for technology to mimic (Gershon, 2017). The single constant is that change will occur.

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