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Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA): Employees' Perceptions of Our Future Workplace

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Abstract: *By 2025, according to futurists, Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA) could take a third of the jobs that are currently available. However, little is known about how employees view these technological advancements in relation to their careers and jobs, or how they are preparing for these potential changes. For the purpose of this study, a brand-new metric known as "STARA awareness" was developed. It measures the extent to which employees believe that these kinds of technology could take over their jobs. We also used age as a moderator in STARA because age is associated with career advancement and technology knowledge. We tested STARA awareness on a variety of job and well-being outcomes using a mixed-methods approach on 120 employees. Increased STARA awareness was positively associated with intentions to leave the company, cynicism, and depression, but had a negative correlation with organizational commitment and career satisfaction. Keywords: career planning, change, technology, disruptive technology, employees.*

Keywords: Smart Technology, Artificial Intelligence, Robotics, and Algorithms

I. INTRODUCTION

The rise of Smart Technology, Artificial Intelligence, Robotics, and Algorithms, or STARA, has been dubbed by prominent scientists and businessmen like Stephen Hawking and Bill Gates (Bort, 2014;Lynch, 2015).According to Frey & Osborne (2013), it is anticipated that by 2025, STARA will have taken one-third of the currently available jobs.2014 Thibodeau)According to Frey & Osborne (2013), this is as a result of significant advancements in robotic intelligence and dexterity as well as low-cost autonomous units that have the potential to outperform humans at numerous manual and conceptual tasks.

Retail self-checkouts, smartphone applications, accounting automation, the internet of things, and upcoming developments in driverless cars are all examples of these kinds of technologies. It is difficult to contemplate the continuation of human employees in certain positions due to the cost-benefit or payback on these kinds of technology. According to Human-Use Experience (2015), a four-lane supermarket self-checkout system costs $125,000 (though this price is expected to fall and vary by country).This is typically less than or equal to paying four employees minimum wage for an annual average of 40 hours of work. It is clear which option is more cost-effective for the retailer when one considers that the self-checkout system can operate seven days a week, twenty-four hours a day, seven days a week, and that the employer does not have to pay taxes, provide pensions, health benefits, or other benefits, or give breaks to the self-checkout system. Once the technology is improved, driverless cars will be the same.

Strangely, STARA isn't just being used in low-paying, low-skilled jobs. In legal research, sophisticated algorithms are being used: For instance, according to Frey & Osborne (2013), the Clearwell system was programmed to sort and analyze 570,000 documents in two days—a task that would normally have been performed by lawyers and paralegals. In addition, business and news media will increasingly employ report-writing algorithms. In addition, robots with high precision dexterity are becoming significantly less expensive (Frey & Osborne, 2013).

The likelihood that computerization, or STARA, will replace jobs was analyzed in detail in a study of 702 occupations. Accountants, market research analysts, commercial pilots, customer service, sales staff, office/administration workers, and so on are among the jobs at risk.2013 (Frey & Osborne).According to Bloss (2011), STARA may also have a

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significant impact on medical Lorentziadis, 2014), the transportation, farming, forestry, and fishing industries, as well as education (such as through mass online learning).According to this landmark study (Frey & Osborne, 2013), 47% of jobs could be taken by STARA overall. Many of these jobs are in the service industry and are not low-skilled but high-paying middle-class positions. According to Goos & Manning (2007), this occurs at a time when income inequality is increasing.2009, Goos, Manning, and Salomons;2013 by David and Dorn).Given that "household wealth in New Zealand was concentrated in the top 20% of New Zealand households, which held about 70% of total household net worth," this presents a significant challenge (Statistics New Zealand, 2016:1).According to McCammon (2016), this report demonstrates the widening gap between "Haves and the Have Nots."

Even if the occupation does not fall under the high-risk category, it may still be affected by STARA in other sectors. Driverless cars, for instance, may eliminate the need for licensing officers, driving instructors, insurance assessors, panel beaters, and other related positions .because driverless cars have the potential to reduce the number of accidents).Additionally, it has been suggested that personal automobiles will be able to drive all night while people sleep, putting pressure on the lodging and airline industries (Zaldivar, 2015).According to The Economist (2014), new technologies may replace jobs that cannot be replaced. The primary objective of this study is to (1) create a STARA awareness measurement based on these potential workplace changes; (2) Determine whether employees perceive STARA awareness as a threat to their job or career; and (3) ascertain whether or not STARA has any effect on a variety of current employees' job and well-being outcomes. In relation to STARA perceptions, we draw on the literature on career planning.

II. LITERATURE REVIEW

2.1 Industrial Revolutions: History Repeating?

The workplace has undergone significant transformations in the past and is considered to be the norm. In general, many developed nations have seen significant declines in the primary (farming/mining) and secondary (manufacturing) sectors (Dennis, 1978;Notowidigdo, Hurst, and Charles (2013)).According to Spohrer & Maglio (2008), many of the displaced workers in these economies eventually moved into the tertiary (service) sector as new jobs were created. These revolutions have been sparked by a variety of factors, including textile mechanization, steam power, advancements in transportation, production lines, labor specialization, electricity, and improved communication (Jensen, 1993).According to Gray (2013), a significant factor in "hollowing out" the skills distribution was electrification in manufacturing. According to Gray (2013), the loss of low-skilled jobs led to an increase in demand for administrative and managerial positions. However, with our subsequent revolution, this might not be the case. According to Feng & Graetz (2015), the market is losing middle-class jobs as a result of technology like STARA's increased efficiency. The wages of middle-class professions frequently account for a significant portion of a given business's overhead costs, which is why the service industry has the greatest incentive to replace employees. The fact that affected workers in the service industry may not have immediate access to a "fourth" industry or a variety of new jobs is even more concerning. According to Bryanjolfsson & McAfee (2011), the impact of STARA on the service sector will be comparable to a new industrial revolution and will take decades to manifest.

2.2 Career Planning and STARA

STARA awareness captures the extent to which an employee views the likelihood of Smart Technology, Artificial Intelligence, Robotics and Algorithms impacting on their future career prospects.T his approach, developed for this study, is positioned within the career-planning literature with Greenhaus and Kopelman (1981), suggesting that career planning has several key and sequential parts. The following details serve as the foundation for these sections:1) one's talents, values, and interests; 2) the opportunities in the workplace; and 3) interests related to work, family, and leisure. The individual may also have their own strategies and objectives for achieving their career goals. In general, "refers to individuals' outlining future career developments and to their setting and pursuing career goals" is what we mean when we talk about career planning (Zikic & Klehe, 2006:393).It is essential to keep in mind that career planning is an ongoing process that must be evaluated and carried out throughout a person's entire life. Early career-planning research by Gould (1979) suggested that employees with higher levels of career planning had more effective careers.

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2.3 STARA and Well-Being Outcomes

We propose that awareness of STARA will have an impact not only on job outcomes but also on well-being outcomes. Psychological well-being can be affected by how an employee defines their career identity and measures their own career success (Mirvis & Hall, 1996;Baltes, Wiese, and Freund, 2002).Well-being is expected to suffer when one's prospects for the future are reduced. For instance, employees' mental health can be significantly impacted by workplace job insecurity. Job insecurity was found to be a predictor of psychological health (i.e., psychological stress and burnout) in Dekker and Schaufeli's (1995) study of an organization going through significant organizational change. According to Dekker and Schaufeli, "silence from above surely erodes the extent to which workers experience control over the future of their jobs," they concluded that long-term uncertainty in a job was more detrimental than knowing whether one would be laid off (1995:62).

It is abundantly clear that some employees may suffer as a result of this uncertainty regarding their career and work prospects. According to Chen, Chang, and Yeh (2004), there may be an increase in nervousness and stress in the workplace if a person's needs are not met by their career options. We anticipate that STARA awareness will play a role in this rise in anxiety and stress. On the other hand, on the other end of the spectrum, those who are blissfully unaware of the changes that are taking place may be able to cope better than those who are aware that STARA may limit their career opportunities. According to Mirvis and Hall, "one prominent way that working people have dealt with disillusionment is by sliding into cynicism... in doing so they lower their expectations of commitments to an employer"377).Thus, we investigate two well-being outcomes: skepticism and depression. According to Axtell et al., depression has been defined as "low pleasure and low arousal."2002:222), whereas cynicism refers to an "indifference or distant attitude toward work, as well as having a callous and cynical attitude toward work" (Roche & Haar, 2013:519).Therefore, we contend that an employee will experience lower levels of arousal and pleasure as a result of STARA awareness (for example, "an inanimate object – a robot – may do my job better!").and in a similar manner can result in cynicism and indifference at work (for instance, "why bother with this job, once the robot is programmed I'll be given the boot").The subsequent set of hypotheses follows from this.

III. METHOD

3.1 Research Context

The following study was conducted in New Zealand, which is a socially and economically developed nation and the seventh most developed in the Human Development Index (Geohive, 2013).New Zealand, like many other developed Western nations, has switched from employing a large number of people in the manufacturing and agriculture industries to employing a large number of people in the service industry. According to Statistics New Zealand (2012), this is reflected in the country's GDP, which shows steady declines in the primary and manufacturing industries since the 1970s.Since the 1970s, the service industries (such as retail, real estate, finance, insurance, and scientific and technical services) have experienced significant expansion (Statistics New Zealand, 2012).According to The New Zealand Treasury (2012), the service sector currently contributes 71% of GDP.

3.2 Procedure

Surveys were distributed by research assistants in this study. The data were gathered by these research assistants through a combination of online and paper surveys that were identical. According to Coyne (1997), the purpose of the purposeful sampling was to attract a wide range of service sector employees. This study focused on the service industry due to its prominence in New Zealand and many other Western nations. Additionally, it is anticipated that the service industry will bear the brunt of STARA's effects. This is due to the fact that both the primary and secondary sectors

3.3 Qualitative Results

Table 4 divides the three thematic codes into sections. From the potential 67 participants who responded to this question, 32 quotes are displayed in the table.

From a wide range of professions, the perceptions of STARA held by respondents are highlighted in Table 4.There were a total of 35 quotes that were assigned the code 1 (no threat from STARA), 18 quotes that were assigned the code 2 (potential threat from STARA), and 14 quotes that were assigned the code 3 (perceived a real threat from

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STARA).Overall, there is a wide range of comments in the responses, which somewhat reflects the quantitative data regarding STARA awareness (with a low M = 1.7, on a scale of 1 to 5)."Because human interaction is a lot different compared to a robot and it isn't the same and bar work and making drinks is a fine art if you do it the right way" (No. 1) is one specific example of those registering no threat.2, waitress).The phrase "It could certainly help with aspects of the job but there is also a lot of human based aspects that would still be required, it could be a threat but I think there is still a need for human interaction" is a specific example of those who perceive a potential threat as coded 2.26, an agent of travel Last but not least, "Smart technology will assist in making transport solutions more appealing to the customer... Driving buses/taxis is already happening so operationally there is room for this" is a specific illustration of a real threat (No.29, director of transportation services. In the discussion, we make additional references to the comments.

IV. DISCUSSION

The purpose of this study was to find out if employees are aware of STARA and whether they think new technology will take their job or change their career. On a scale of 1 to 5, the mean score suggests that people have little faith in the idea that robots and automation will take over jobs in the workplace. The proportion of participants who were aware of STARA in their current job or career is also reflected in the qualitative quotes' results (and subsequent coding of these quotes).It is currently unknown whether the quantitative or qualitative responses represent "ignorance is bliss" or "keen insight," and we must keep in mind that the potential for STARA is simply that: potential. The extent to which the workplace and workforce will change and the role that technology will play are unknown. However, the present study's findings provide a fascinating perspective on how people perceive their career and employment prospects in the future and how those perceptions influence their employment and well-being outcomes. Employees should think about their STARA-related career opportunities.

The study found that employees are more likely to have lower levels of career satisfaction and organizational commitment when they are more aware of STARA and how it applies to their work. This is consistent with the career-planning model proposed by Aryee and Debrah (1993), which suggested that career planning can foster a positive cycle that boosts self-esteem at work and career satisfaction. As a result, the emergence of STARA may spell the end of effective career planning and, as a result, the negative effects that can be seen here, enhancing the turbulent changes of a career with no boundaries, which may become more common in the future as a result of technological advancements. Employees with a higher perception of STARA are also more likely to have negative effects on intentions to leave the company, depression, and cynicism. Given that "unmet growth-related career expectations, in turn, have been associated with stress, burnout, and turnover intentions," the study's overall findings are not surprising (Virtanen et al.,2003:31).

Interestingly, there was no significant correlation found between STARA and job insecurity, indicating that it may indeed be addressing fundamental work and career planning. An employee who experiences job insecurity may face job loss and be forced to look for a new position. The employment sector as a whole and the job itself may vanish under STARA. In fact, there was no job loss, but some qualitative comments indicated a strong awareness of STARA. For instance, "No" According to paragraph 29, "I can't see AI getting too involved in our sector from a management point of view... at a strategic level I can't see it yet."This demonstrates strong STARA awareness without a personal job loss, possibly highlighting the significant correlation between lack of STARA awareness and job insecurity.

According to Mirvis & Hall (1996), the possibility of lifetime employment in a single organization has diminished employee loyalty and commitment. With the rise of temporary employment, this is especially the case. Long-term commitment in an organization or industry is being undermined in this way, and STARA could be seen as one step in this process. According to Baruch, "From the individual perspective, it is a farewell to traditional commitment to the organization, moving to multiple commitments, which include merely a conditional commitment to the organization," employees must abandon loyalty and commitment (2004:59).This outlook on commitment—as well as commitment to one's career—may have to become the expectation for many workers in the future. However, employees may already see traditional careers as a thing of the past and be much more open to the idea of boundaryless, dynamic, and ever-changing careers that change depending on the employment context.

There was consistent support for interaction effects on job outcomes, in addition to the contribution of linking STARA with job and well-being outcomes. Overall, older workers with high STARA awareness are not significantly different

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from those with low STARA awareness in terms of commitment, career satisfaction, or intentions to leave their jobs. This could be due to the fact that older workers—even those who are aware of the possibility of STARA—do not perceive STARA as posing a significant threat to their employment and career prospects at the moment. For instance, Participants 9 and 10, who were both between the ages of 60 and 70, stated, "I don't see it impacting" and "Not very much at all."While this may indicate that these employees were blissfully unaware of these potential changes, it is more likely to signify the end of their careers. As a result, their STARA awareness causes less stress and strain on older employees.

V. LIMITATIONS AND FUTURE RESEARCH

There are a number of limitations to this study. The sample size should be increased and employees from both the primary and secondary sectors should be included in future research. A longitudinal design that tracks individuals' understanding of technological advancements over time would also be beneficial for this kind of research. Additionally, do particular media landscapes raise STARA's profile? Employees might take the broader repercussions more seriously, for instance, if the President of the United States speaks about the threats to the workforce of the future in the United States or if driverless cars become commonplace. Based on Frey & Osborne (2013), the current study also assumes that STARA could eliminate jobs. Nevertheless, it is likely that additional and diverse jobs will be created as a result. Last but not least, rather than relying solely on turnover intentions to capture this, future research might include more specific questions about career planning as well as the possibility of career/profession changes that employees might be considering. In general, we encourage additional research to improve our clarity and knowledge.

VI. CONCLUSION

The current time period has been referred to as a new industrial revolution. As a consequence of this, we anticipate significant adjustments to our working practices and the types of jobs that will still be available to human employees in the very near future. In a world that is always changing, this study looked at how employees see their careers and jobs in the future. The current state of how STARA is perceived in relation to job and well-being outcomes is highlighted by the present study. In order to assist employees, employers, and policymakers in preparing for these potential changes, further research in this area is required. The overall findings indicate that employees do not perceive STARA as a threat, despite what well-respected business people, scientists, and academics predict. As a result, it is critical that we adequately prepare.

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