Human Rights, Employee Rights and Copyrights – Parallels of AI Enablers and Obstacles Across Occupations in Human-Centric Domains

Presented at: 3rd European Conference on the Impact of Artificial Intelligence and Robotics ECIAIR 2021 A Virtual Conference Hosted By Iscte –Instituto Universitário de Lisboa18 -19 November 2021

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Abstract:
Artificial Intelligence (AI) has been widely assumed to transform industries and occupations in them in the decade to come. Scholarly literature has addressed the phenomenon by studies of computerization across an array of jobs (Frey and Osborne, 2013) as well depictions of the the way AI does the transformation (e.g. Bessen, 2018). There are also studiest on specific occupational contexts such as managerial work and medical profession. This paper recapitulates the findings of three separate futures studies that addressed the potentials of AI-driven change in three distinct areas, which all have traditionally contained a strong human-based element. The primary data for the study was collected via qualitative interview on experts of both application areas as well as AI technology development. The data analyses relied on content analysis via thematic coding and presented using scenarios. The professional areas studied were primary medical care (human rights and human touch), recruitment function within HRM (human resources) and music composing (human creativity). The results of the study offers view on parallels and discrepancies in the AI-supported future between occupations, factors that may spark or slow down the AI-intrusion to the fields in focus.
The results are illustrated to depict the joint potential opportunities as well as challenges in AI use and also the industry-specific benefits and challenges not shared with other domains of activity. The indication is that despite the common basic tenets of the technology, the goals and potential benefits differ in occupational contexts. The research also signals worries on legal and ethical dimensions i.e. rights and responsibilities in AI interventions to work processes across occupational areas.
The research contributes to research streams of process management, technology acceptance and ethics. The research gives also gives pragmatic guidance to AI technology and solutions developers as well as to the organizations and professionals deploying AI-based technologies.

Keywords:, Artificial Intelligence, scenarios, change, technology, generic AI, sector-specific AI

1. Introduction

This paper integrates three separate studies on the potential of adoption of Artificial Intelligence to their specific occupational fields, and concludes as a meta-analysis of the implications of the findings. Artificial Intelligence has gained vast interest across areas of economic activity. The discussion on AI typically focuses on the general level promises and challenges of AI or to opportunities in a specific contexts. The wider-reaching studies on AI impact to occupations such as Frey and Osbourne (2013; 2017) screen a wide array of jobs and their relation to the invasion by the technologies and discuss the associations between technology and future of work.
The meta-analyses comparing studies focused on sole occupations and functions and recognition of patterns – parallels between findings as well as discrepancies is likely to shed new light on the issue area. The *research objective* of this integrative paper can be summoned as: *To search for both shared and specific opportunities as*

well challenges (obstacles) of AI immersion within the domains of 1) HRM in companies (more specifically the recruitment function), 2) Primary health care and 3) Music composition.
Despite the obvious differences, all these areas are seen as human-intensive occupations, where elements like experience, interaction, ethics and creativity play a role.

The *research questions* derived from the objective are:
RQ1: What common opportunities does AI bring to all these fields – and subsequently – what opportunities are context-specific i.e. unshared between contexts?
RQ2: What common challenges does AI face when adapted to these fields – and subsequently – what obstacles and challenges are context-specific i.e. unshared between contexts?

Jointly the RQ1 and RQ2 address the fundamental question RQ3 for AI system development:

RQ3: Is the development of generic AI a plausible choice or should AI solutions be built tailored into their intended domain of usage?

To contribute to the accumulation of academic knowledge on development of both AI and industries in scope, an additional question research question was formulated:

RQ4: What are the academic contributions of the original papers and this summative papers to the development to the field of study?

The research approach of this paper and its sub-studies is exploratory. An exploratory method is a plausible strategy when aiming at (1) scoping the magnitude of a phenomenon ,(2) generating ideas about the phenomenon, or (3) testing the feasibility of establishing more extensive studies of the phenomenon (Bhattacherjee, 2012).
Data collection and analysis is of qualitative nature, in-depth interviews with AI developers as well application area experts were held, the data transcribed verbatim and subjected to thematic content analysis for results.

2. Literature Review

2.1 Defining AI

Artificial intelligence is a widely discussed area of technological development. AI definition has been done from many angles and the concept is under constant development. The definition by Wang (2008) states that "the essence of intelligence is the principle of adapting to the environment while working with insufficient knowledge and resources". According to Wang (ibid.) an intelligent system relies on finite processing capacity, works on real time and is open to unexpected tasks and able to adapt by learning. Alternative definitions have been operationalized such as by Saukkonen et al (2019) in a study on emerging technologies within HRM: "AI is a field of computer science dedicated to solving cognitive problems commonly associated with human intelligence, such as learning, problem solving and patter recognition."

2.2 Technology immersion and acceptance

The spread of emerging technologies is not solely defined by the efficiency of systems based on novel technologies. Technology acceptance models (Venkataram & Davis, 2000) point out individual and organizational variables such as perceptions of usefulness and ease-of-use as well quality of (new) system output and relevance for the tasks. These variables in Technology Acceptance Model (TAM) affect attitudes that lead to intentions to the actual system usage and finally to the usage of a technology.
The commercialization of emerging technologies to wider market adoption has also proven to be slow, due to the potential customer base being divided to various fractions, out of which the early market of innovators and early adopter cohort represent some 15 % of the total user base (Moore, 1999). The timespan from a technology trigger to a wide market adoption takes typically 5 to 15 years to materialize (Linden and Fenn, 2003).
Furthermore, Mikalef et al. (2018) conclude that there are multiple dimensions of organizational inertia that new technologies face in business-to-business context. These intervening and potentially threatening of pace-limiting forces to new technology adoption take economic, political, socio-cognitive, negative psychology, and socio-technical forms (ibid.). In practical terms these obstacle for emerging technologies are perceived to lie in uncertainties of technology choice and total cost of implementation (Saukkonen et al., 2019).

2.3 Human-Machine interaction

AI has potential to replace human effort and intelligence in organizations but also to act as an augmenting asset to human capability. Sadiku et al. (2020) highlight the differences of Human ns. non-Human intelligence and propose the realistic target of AI development to be the system integrating humans and machine. Frey and Osborne (2017) claim that "even with recent technological developments, allowing for more sophisticated pattern recognition, human labour will still have a comparative advantage in tasks requiring more complex perception and manipulation". Hence, a strong stream in current discussion and research as well as anticipations of short- to mid-term impacts of AI focus is on technology as a tool for human augmentation (e.g. Valeriani et al., 2019) and human-machine interaction and collaboration.

2.4. Ethical and Legal considerations in AI-assisted work processes

Emergent technologies are described as enabling ones, since they make possible new functionalities in systems, processes and organizations. The novel knowledge and technology areas also are increasingly "generic", since they will over time to be found almost everywhere across segments of societal and business activity.
AI has been labelled with the adjectives of "generic" and "ubiquitous" numerous publications within research community (e.g. Dwivedi et al., 2019; Bifet and read, 2018) whereas the enabling nature has been more exhaustingly studied for specific purposes and occupations (Black and Van Esch, 2020; Cope et al., 2020). The AI is also referred as an umbrella term for a variety of technologies that enable the AI development and applicability itself (e.g. Modrzejewski and Rokita, 2019).
The width of AI applicability has also raised concerns. As Teece (2018) puts it "technological and innovational complementors present both coordination and market design challenges to the innovator". Many concers have been expressed on ethics and societal legitimacy of AI development and usage (Bryson and Winfield, 2017; Rodrigues, 2020). The SHERPA-project has consecutively published seven recommendations for ethical standards for AI, including among others recommendations of a) establishing a strong regulatory framework for AI, b) couple teaching of technical AI competence with teaching of ethical dimension and c) establishment ethics officer positions in AI-intensive organizations (EU, 2021). Since all the measures proposed by EU and respective collaborative bodies are taking place at a slower pace than AI development and potential usage, the inclarity of ethical and legal stances can be an obstacle of AI deployment.

3. Results

All three occupations in foci of the original studies belong to the cohort of "relatively safe" occupation vs. the possibility of them to be taken over by intelligent machines (by Frey and Osborne, 2017). HR Managers were calculated to be in the risk of 0,55 % probability to be replaced of replacable by machines, medical doctor occupations at a risk of 0,4 to 0,5 % depending on the field of specialization and finally, music composers were forecasted to face with a 1,5 % size of risk is this respect. However, all studies highlighted some areas where AI can transform and speed up processes within an occupation and thus if not replace at least redefine the contents of work. Similarly, in all studies the obstacles and challenges for wider AI adoption were identified.
Both in terms of opportunities as well as challenges there were some issues overarching the three segments of activity as well as context-specific ones. The following Sections 3.1. to 3.3. present the original studies briefly and the Section 3.4 summarizes and illustrates the findings as a summative contribution of this paper.

3.1 Study 1: AI and Primary Health Care

The study on the prospective trends of AI adoption in Finnish primary care identified three major trends which ascertain technology development within the industry: integration of AI in the pre-diagnostic stage; in the process of administering diagnostics; and in the post-diagnostic stage. Several future foresight techniques were utilized in order to present the respective theoretical framework for AI's implementation including Multiple Perspectives, Future Radars and Scenario Planning. The research findings derive from 13 in-depth semi-structured interviews with professionals from the healthcare and IT sector. have been briefly summarised in the table below for the purpose of this study.

The underlying implications of the discovered research results can be evaluated across the positive and negative spectrum on their associated influence over fostering or hindering AI adoption in the field of primary care (Table 1).

	Future foresights
Possibilities	Empowering patients in the matters regarding basic self care; meaningfully re-organising medical staff; enhancing population healthcare management; improved life planning through predictive analytics
Motives	Cutting down costs; promoting treatment accessibility; supporting scientific activity in the field; reducing adverse impacts of human factors in administering medical procedures; optimizing the delivery of healthcare operations
Threats	Misguided usage of the technology; technology is susceptible to cyber-terrorism and hacking; ambigiuty of responsible party for incorrect treatment; power imbalance in access to citizens' health data
Barriers	Connectivity problems and power shortages; protection of sensitive healthcare information; issues regarding patients' privacy and confidentiality; debate on human over-reliance on technology

Table 1. Evaluation of research results on projected future foresights for AI usage in primary health care

To sum up, personal and organisational inference will be as significant as technological to capture a projected future of AI's adoption within primary care. Healthcare delivery is continuously becoming more challenging and complex with much of that complexity coming from large amounts of data generated during medical operations. AI reasoning and learning capabilities can be utilized to analyze these data in an intelligent and autonomous fashion without constant human supervision. In addition, AI technologies are in a great position to address both the need for more cost-effective care and aiding to fill some of the anticipated staff shortage. AI is not seen capable of fully replacing the human element in the provision of care, thus there is a need to investigate a model that combines technological and human capabilities.

3.2 Study 2: AI usage in recruitment

The results of AI's potential on recruitment were divided into two different themes. *Theme 1* mapped out a sample of the current situation of AI usage in recruitment amongst international technology businesses located in Finland. *Theme 2* shows experts' views on reasons for current usage/non-usage of AI. This data is compiled in Table 2.

Table 2. Reasons for usage and non-usage of AI in recruitement

	Does NOT use AI	**Uses AI**
Reason for non-usage	Pleased with traditional methods Lacks AI knowledge	
Contemplating between usage vs. non-usage	Needs a decision on AI investment	
Reasons for usage	Would minimixe manual workload=> optimize resources	Efficiency in screening and matching to profiles Improvement on customer (candidate) experience via feedback automation Communication Improvement through the "competence community"

Theme 2 results were produced with same coding procedures as theme 1 results. After the same steps the results were divided into two different main categories, enablers (further divided to possibilities and motives) and challenges (threats and barriers). (see Table 3 below).

Table 3: Evaluation of research results on projected future foresights for AI usage in recruitement

	Future foresights
Possibilities	Resource Efficiency and Optimization, Predictivity
Motives	Streamline and support for the traditional process, Consumption behaviour and culture of adaptation
Threats	Ethical Issues, Data security and law issues
Barriers	Human Interaction, Resources vs. value

Overall, positive foresights were more common than negative outcomes of AI possibilities in recruitment. Resource efficiency and optimization of work were viewed as the most likely possibilities of AI . Streamlining the traditional process was viewed as a feature that will have the most meaningful impact over recruitment. On the negative side of things, the lack of human interaction was viewed as the major barrier of AI's future in recruitment. Data security and law issues were the biggest threats towards AI development.
The results propose that AI will bring a transforrmative future change into recruitment, with no clear agreement on when the change will occur. Automatization of manual processes was seen to be fastest developing feature what AI will change and predictivity was thought to be the greatest leap forward.

3.3 Study 3: AI impact on Music Composing

The research showed that AI is already bringing changes into the process on multiple levels: from suggesting musical ideas to the human creator, who closely cooperates with AI, to being able to produce the whole pieces on its own. Human participation in the process is still major to date, as the material suggested by AI is best used as a starting point for building a composition- However, software developers are currently striving to make AI-composers more accurate and independent by making them able to read scripts, make orchestral arrangements and evaluate their own work. This would make AI a more substantial tool, both when paired with a human composer and used on its own.

The cultural image of AI is twofold. On one hand it is a noteworthy phenomenon that contemporary artists strive to use as a composing tool. On the other hand, the new solution may impact the existing revenue models and, consequently, beneficiaries of the music industry. Shall the operational advancements take place, AI may challenge the work of some composers, whose work is comparable with the output provided by AI. The expert interviews affirmed that innovations have at all times stayed essential to the music industry and progress in general, but can't please everyone at once, and thus some trade-offs should be expected.

The most problematic matter for AI-composers concerns the recognition of works produced with no human input. Such works are not liable to copyright protection in most legal systems. Besides, training an algorithm on the copyright-protected material might easily cause several legal issue. As opposed, up-to-date legislation would incentivize the research in AI and make revenue allocation more just and transparent.

Table 4: Evaluation of research results on projected future foresights for AI usage in composer occupation

	Future Foresights
Possibilities	Faster creation of versatile mock-ups; generation of case-relevant music that needs less tweaking.
Motives	Development of suitable media (e.g. gaming); dominating interest towards technologies in the music field.
Threats	AI becoming comparable to some composers, who can't take advantage of it; preference to AI for making background music.
Barriers	Absence of legal revisions or release of even more constraining ones; disruptive image of AI in media.

3.4 Integrative results

AI can be described in a general terms of principles and algorithms that serve for generic AI (like Natural Speech Recognition) and only differs and transforms over time as imposed by sector-specific training and analysis data. However, our results showed 1) different application areas to manifest AI opportunities and challenges differently, but also 2) the different applications areas to share some overarching generic features.

3.4.1. Opportunities of improvement via AI

As Figure 1 summarizes, the generic promise of AI to be able relentlessly screen vast data pool looking for patterns and propose choices, this feature brings different options depending on the application area. In medical field AI's assistance in to find the most likely diagnosis and suitable treatment by comparing the task in hand to a vast pool of past cases. This enhancement of a human's professional capabilities is also common to occupations in HRM and artistic field. In all cases the AI is (currently) preparing the final decision made by a human due to legal/ethical considerations (discussed later in Section 3.4.2.). In different occupations, however, these AI benefits are used differently. Whereas in Medical and HRM fields (sub-studies 1 and 2) the past data is used to find resemblance and to narrow down the options, in artistic field the solutions sought are expected to deviate from prior solutions and AI is used to expand the number of potential solutions rather than narrow them. Likewise, both artistic field and HRM are using data from limited and format-wise similar data sources, whereas the medical field combines data from sources different both in sources and format.

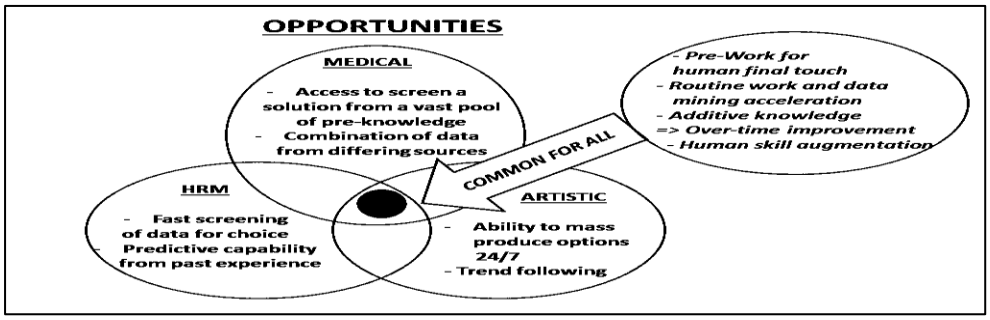

Figure 1: Opportunities of enhancement via AI adoption across and between occupations.

3.4.2. Challenges for improvements via AI

The challenges of A in the studied domains contain some generic and some sector-specific features. The major obstacles (summarized in Figure 2) common to the domains is the unsolved legal and ethical stance in the responsibilities of machine-made solutions and/or recommendations. Since AI output quality is dependent of the algorithm and training data (though data reliability is improving over time by usage), biases and errors are possible. The core of the algorithm is not fully shared between the parties and naturally no party is willing to take full responsibility in cases where the AI usage brings a negative outcome. This unites Medical and HRM domains, whereas in Artistic field the issues of rights and responsibilities concern more the positive creations made by/with AI and their intellectual property rights. The ability of AI to mass produce causes problem for a human to match the flow the AI outputs and act on them, unlike in Medicine and HRM.

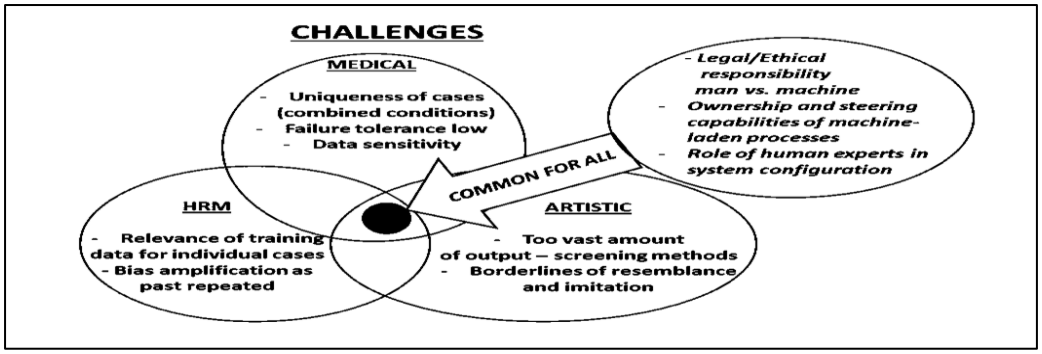

Figure 2: Challenges in and for wider AI adoption across and between occupations

4. Conclusions

The integrative analysis of the sub-studies produced the following answers to the research questions set.

RQ1: What common opportunities does AI bring to all these fields – and subsequently – what opportunities are context-specific i.e. unshared between contexts?
The common opportunities for AI lie in the generic capability of AI to combine and process rich (in amount and format) sets of data. This benefits the user in process acceleration as well as predictive "goodness" of solutions based on pattern matching with the past data to improve the human choice and decision-making. However, the capacity and speed of AI is deployed in medical field primarily to end up with one most plausible solution, whereas in musical production the strength of AI lies in the sheer number of the alternatives it can prove by variations. In HRM, in its turn, AI mainly screens and selects a sample of candidates, so it positions between the other two areas in the type of usage.

RQ2: What common challenges does AI face when adapted to these fields – and subsequently – what obstacles and challenges are context-specific i.e. unshared between context?
The challenges of the AI usage across domains are mostly connected to the (so far) unsolved legal and ethical issues. As was stated in the answer to RQ1, Ai can improve (do the pre-work and suggestions) human decision-making. The borderlines of rights and responsibilities between process stakeholders are a major challenge for AI adoption. The human input to AI system is linked to the creation of the algorithms within AI system, decision on its deployment and finally the actual AI usage. In case the stakeholders don't know their responsibilities and rights linked to AI for the task/process, they are likely to opt out of AI. There are however some differences between occupations. In medical and HR fields the questions revolve around responsibilities in false or biased choices done/supported by AI. Also the question of legitimacy and ethicality of using data sources without the customer consent (patients and job applicants) is a sensitive area. In music composing the data is openly available and the challenges relate to sharing of intellectual rights of the output and in infringement cases when damages are caused to IP owners. The obstacles identified are conceptual and concern large societal systems (law, fairness), whereas the findings on opportunities (answers to RQ2 above) were more pragmatic and the issues solvable by industries and organizations in their own contexts.

RQ3: Is the development of generic AI a plausible choice or should AI solutions be built tailored into their intended domain of usage

Our study indicates that the individuals and organization deciding on the usage/non-usage of AI should not only understand the generic characteristics (opportunities and challenges) of AI, but also the issues specific to their operating environment. These considerations should be cooperated on by different stakeholders of business and AI development processes.
The study proposes that the deployable and productive AI systems can use to certain extent generic principles and technologies (e.g. natural language processing, pattern recognition) but true impact for organizations in any context takes place when the solutions are tuned for the purpose in a sector-specific manner. This is a business threat to AI system developers, as their opportunities to productize and scale their solutions are harmed. On the other hand, current AI knowledge capability constraints of sector-specific issue specialists limit the proceeding in that direction.

To summarize, the main obstacles/challenges to AI system implementation to the professional fields reside in the generic socio-legislative sphere (ethicality, understandability, transparency), whereas the benefits/opportunities are industry- if not case-specific. Thus, also the solutions should be worked on by actors on the respective levels. Societies and industries need to work on socio-ethical-legislative front to offer a generic framework and control mechanism in which AI developers and users can reap their individual AI benefits. As the legislative system is typically acting slowly in comparison to the technology development, some challenges (like trade-offs in clarity of rights and responsibilities related to the use of AI) need to be accepted as a (current) default setting in case AI benefits in efficiency and quality of output in the occupations we studied are sought. Reversing the famous statement by author Anton Tsehov (about happy vs. unhappy families) we state that "each unhappy (in relation to AI) business is unhappy in the same way, and all happy businesses are happy in their own way".

RQ4: What are the academic contributions of the original papers and this summative paper to the development to the field of study?

Our results indicate that the technology acceptance models updated for the era of AI should contain a strong ethical-legislative component, a point of view that in the era of data mining, combinatory and predictive systems represents an element with deep and wide impact to business ecosystems and actors in them. The ubiquitous and self-improving nature of AI challenges the traditional software development and implementation processes and models of impact assessment of ICT systems. If these issues are ignored first in research and consequently in practice, the reputational risks involved in AI development may kill many potential benefits of AI to their cradle. A Technology Acceptance Model updated and specified to AI lifted to the level of decision-making to societies – where many unsolved challenges reside - would offer important areas to study.
Based on our research we advocate for the view that the research on AI applicability would bifurcate to 1) generic discussion and research for ethical-legal facet of AI development and to 2) sector-specific AI system design and studies on impact of AI to work processes and profession within sector. We claim that the current *modus operandi* where the socio-ethical and functionality dimensions of new AI application need to be discussed and agreed on for each specific case is an intermediary yet necessary step in the path of technology evolution.

5. Discussion

To study a technology area taking leaps in development alters the findings to obsolescence. However, the legal-ethical debates on AI have prevailed for long, and even though the research and work (e.g. by government/industry committees) to establish principles and rules on AI usage has intensified, the challenges are not to be solved soon. Simultaneously, new application areas and advanced algorithms raise additional questions generally and domain-specifically.
A longitudinal approach would be beneficial to follow the evolution of AI applications and thus yield contributions to AI research but also to more generic development of technology acceptance and industrial evolution via technology.
This research is exploratory, positioning itself in the terrain between wide scanning of AI promise across occupations (Frey and Osborne, 2013) and numerous studies on AI impact in one specific area. The sample chosen for the meta-analysis was purposeful and to a certain extent of convenient nature, as the original studies were done on a stand-alone basis but at the same time. Nevertheless, our work was able to raise issues of interest and importance for both sector-specific as well as generic development and research on AI impacts for further study.

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