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# Implications of Artificial Intelligence in Action – A Jamaican Perspective\*

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## Abstract

Creative expression, and authorship of creative works, has long been associated with humans. Artificial Intelligence (AI) algorithms generally associated with routine tasks, are now being used in the creative industries. While human effort is still necessary to perfect creative works done by technology, ongoing algorithmic improvements and adaptations have further advanced the creative capabilities of AI technology. If humans are unable to decipher whether a painting, a piece of music or a literary work was created by humans or an algorithm then it potentially opens a Pandora's Box. What therefore are the legal implications in the creative space when an algorithm passes the Turing test, i.e. when a human is unable to tell whether an output (artistic work) was generated by a human or a machine?

In July 2021, workshops were held in Jamaica with stakeholders from the creative industries, the technology industry and legal practitioners to determine their knowledge of capabilities of AI in the creative industries and their perspectives on the possible legal implications of a creator not being human. This paper considers the legal significance of the presumption that, creativity and authorship, tenets on which intellectual property (IP) protection is generally premised, emanate from a person. Arguably, the dialectic is not whether AI has supplanted human creativity, or the difficulty with being able to distinguish a work created by a human or autonomously by AI. The polemic posed is, what, if any, legislative or regulatory accommodation is needed to address

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acknowledgment or non-acknowledgment of AI as an author. Further, to what extent, if any, should creative works autonomously produced by AI be deemed protected IP assets. This paper brings into focus analysis of data gleaned from Jamaican stakeholders that suggests there is justification for heightened economic reward for AI owners and creative output bade solely by AI, even if AI is not ascribed the legal title of “author” or “inventor” and the attendant rights and responsibilities of ownership.

## 1. Introduction

Creativity is a feature of human intelligence, it involves not just generation of new ideas but also motivation and emotion behind the cognition, is closely linked to cultural context and personality factors.<sup>9</sup> The word “creativity” has been evolving, it continues to mean different things to different persons.<sup>10</sup> According to Boden, Artificial Intelligence (AI) algorithms can be used to create new ideas in three ways, by combination, exploration and transformation.<sup>11</sup> AI has the ability to produce artifacts which is a combination of familiar ideas. AI can create artistic works by exploring the potential of conceptual spaces and thus creating artifacts that are not only novel but also unexpected. AI can create artistic works by transforming a dimension which gives rise to new structures which could not have been generated before - and this could result in creation of novel concepts especially if the dimension being transformed was fundamental. In recent years AI has been successful in creating artistic works by using these creativity methods. In this paper we present and comment on such artistic works.

In AI the Turing Test has been used to determine if computers can act like humans. In a Turing Test a computer and a human are interrogated by a human - and if the interrogator is not able to distinguish between them, then the computer is considered to be intelligent. If we use the Turing Test to determine creativity, then it raises many questions, including the following:

- If a human interrogator cannot determine if a particular artform is created by human or by a computer, then should the computer or the person creating/running the algorithm on the computer be considered as the creator?
- If the artistic works created by computers have the same aesthetic value as one created by humans, then can the computer or the person creating/running the algorithm on the computer be considered creative?

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<sup>9</sup> Margaret Boden, ‘Creativity and artificial intelligence’ (1998) 103 *Artificial Intelligence* 347 <<https://www.sciencedirect.com/science/article/pii/S0004370298000551>> accessed 23 April 2022.

<sup>10</sup> Arthur Still and Mark d’Inverno, ‘A History of Creativity for Future AI Research’ (Proceedings of the Seventh International Conference on Computational Creativity, June 2016)

<sup>11</sup> Boden (n 9).

In this specific regard, in July 2021 we organised a workshop in Kingston (Jamaica) and a stakeholder consultation with policy makers, intellectual property (IP) lawyers, technologists and creative persons. Stakeholders were polled on their knowledge of AI and IP, especially copyright and patents. In the workshop we exposed participants to various artistic works that were created by one of the members of our research team (Matthew Stone) by using algorithms. We got the views of the participants on the issue of who should be considered the creator of such artistic works. The results of the consultation are presented in this article.

## **2. Creative applications of AI**

It is no secret that as technology improves there are greater creations made by AI technology as well as useful tasks to be completed as a result of its aid. There is a relationship between AI and robotics, where AI forms as the brain of the robotic equipment or something entirely different. With that said, the use of AI especially in robotics comes into play when such technology is used while conducting surgery, or the sanitization of rooms, handling of medication amongst other things. Further use of AI has been seen in the creation of art where in 2018 the collective Hugo Caselles-Dupré, Pierre Fautrel and Gauthier Vernier used artificial intelligence to create the world's first fully AI produced artwork. With the present actualizations of these creations across the world, the possibility of AI being used to do the same in Jamaica, triggers an IP discussion.

In this section we explore the state of the art tools for creating various artistic works specifically inspired by Jamaican culture using machine learning. Our work looks at three main forms of creative expression: visual art, music and creative works of literature e.g poems. Our analysis seeks to answer two main questions.

- (i) Can state of the art AI tools and algorithms produce Jamaican artistic works?
- (ii) How much of the creation was due to human input vs the output of the algorithms?

### *2.1 Music*

In the field of artificial intelligence artifacts like music are typically generated using a technique called machine learning. Machine learning involves learning from data/examples. In this case a machine learning model is trained on a collection of music in the style (reggae, classical) that is required to be generated. The model learns a pattern of how to generate music from that data. There have been several works over the years that use machine learning to generate new pieces of music. Several works use a machine learning model called a neural network which is loosely inspired by the neurons in the human brain to learn how to generate a sequence of notes which produces music.<sup>12</sup> The researchers specifically used a particular type of neural network called an

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<sup>12</sup> Agarwala, Music Composition using Recurrent Neural Networks.

LSTM (Long Short Term Memory Module).<sup>13</sup> The LSTM works by learning to predict the next likely note given a sequence of preceding notes. The LSTM makes use of a vector referred to as the hidden state which in essence maintains the state of the model and acts as the model's memory. The parameters of the model are tuned to make it more likely to make correct predictions. LSTMs generally do well on modeling audio that can be represented easily as a sequence of notes but less so on more complex audio waveforms such as a voice for instance.

This led to further improvements in models of this type. Researchers at Google Deep mind created Wavenet,<sup>14</sup> a model that could also produce realistic sounding voices. It achieved this by modeling the raw audio waveform instead of trying to model a sequence of notes. In this work they made use of Causal Dilated 1D Convolution layers. From there that same research group produced a musical transformer<sup>15</sup> which made use of a neural network architecture referred to as the transformer<sup>16</sup> which makes use of attention layers which seem to capture more context using the entire sequence and hence producing more realistic sounding pieces of music. OpenAI used a similar approach in their work MuseNet.<sup>17</sup>

Music is a very popular expression of creativity in Jamaican culture. As is known, the most popular genre of music originating from Jamaica is reggae. Reggae music is characterized by musical elements of rhythm and blues (R&B), jazz, mento, calypso, African, and Latin American music, as well as other genres. One of the most easily recognizable elements is offbeat rhythms; staccato chords played by a guitar or piano (or both) on the offbeats of the measure. The tempo of reggae is usually slower paced than both ska and rocksteady.<sup>18</sup> We sought to see if there were any state of the art models that had attempted to model reggae music. The best model we found was Jukebox<sup>19</sup> by OpenAI which could produce music in the style of Bob Marley. The output from our assessment would not be winning any Grammys anytime soon but we were pleasantly surprised the model was able to capture some of Bob Marley's essence in the sound. We then used the tool to create our own music in the style of Bob Marley. We simply had to input lyrics which could have been generated by another AI script and choose what style you want it in and it produced music. Although the music produced was not great, we expect it should improve as new models come out but this does show how easy it is and how little human input was required to do this.

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<sup>13</sup> Sepp Hochreiter and Jürgen Schmidhuber, 'Long Short-term Memory' [1997] 9(8) Neural Computation 1735

<sup>14</sup> Aaron van den Oord and others, 'Wavenet: A Generative Model for Raw Audio' (2016) <<http://arxiv.org/abs/1609.03499>> accessed 19 April 2022

<sup>15</sup> Cheng-Zhi Anna Huang and others, 'Music Transformer: Generating Music with Long-term Structure' (2018) <<https://arxiv.org/abs/1809.04281>> accessed 19 April 2022

<sup>16</sup> Ashish Vaswani and others, Attention is all you need. In: Advances in Neural Information Processing Systems. (NIPS Conference, Long Beach, 2017)

<sup>17</sup> OpenAI. 'MuseNet' (2019) <<https://openai.com/blog/musenet/>> accessed 19 April 2022

<sup>18</sup> Kevin O'Brien Chang and Wayne Chen, *Reggae Routes: The Story of Jamaican Music* (Temple University Press 1998)

<sup>19</sup> Prafulla Dhariwal and others, 'Jukebox: A Generative Model for Music' (2020) <<https://arxiv.org/abs/2005.00341>> accessed 19 April 2022

## 2.2 Art

The most popular technique for generating novel pieces of art in the field of artificial intelligence is using a machine learning model called a GAN (Generative Adversarial Network). The GAN<sup>20</sup> consists of two main parts, a generator and discriminator. The generator's job is to create realistic looking pieces, good enough to fool the discriminator whose job is to be able to differentiate between a real work of art and a fake one. The two parts play a tug of war battle with one improving the other and vice versa. Essentially as the discriminator gets better at telling apart real vs fake, the generator must get better at producing more realistic looking fake pieces of art to be able to fool the discriminator.

There have been several iterations on GAN, one such iteration is the DCGAN<sup>21</sup> (Deep Convolutional Generative Adversarial Network) which also makes use of another neural network model called a convolutional neural network which is suited for image input. This model was used by a group of students to create art in the style of famous painters which they called GANGogh,<sup>22</sup> named after the famous painter Van Gogh. Another work AICAN<sup>23</sup> (AI Creative Adversarial Network) was trained on 100,000 of the greatest works in art history and produces wonderful pieces of art. As with music we then sought to see if there were any state of the art models that could produce Jamaican style artform. We used a model called VQGAN + CLIP.<sup>24</sup> This model combines two models VQGAN (Vector Quantized GAN) which makes use of an autoencoder encoding images into a latent space which can then be decoded into new images. It makes use of a transformer and convolutional neural networks to improve efficiency. This model is paired with CLIP (Contrastive Language Image Pretraining) which was trained to pair images with text. To generate art, we simply provided a snippet of text and the model would generate the image from there using the text as a guide. Below we show a sample of the images we generated using the model. This is yet another example of little to no human input required to generate novel pieces of art.

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<sup>20</sup> Ian Goodfellow and others, 'Generative Adversarial Networks' (2014) <<https://arxiv.org/abs/1406.2661>> accessed 19 April 2022

<sup>21</sup> Alec Radford, Luke Metz and Soumith Chintala, 'Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks' (2016) <<https://arxiv.org/abs/1511.06434>> accessed 19 April 2022

<sup>22</sup> Kenny Jones, 'GANgogh: Creating Art with GANs' (2017). < <https://towardsdatascience.com/gangogh-creating-art-with-gans-8d087d8f74a1>> accessed on 19 April 2022

<sup>23</sup> Ahmed Elgammal and others, 'CAN: Creative Adversarial Networks, Generating "Art" by Learning About Styles and Deviating from Style Norms' (2017) <<https://arxiv.org/abs/1706.07068>> accessed 19 April 2022

<sup>24</sup> Patrick Esser, Robin Rombach and Bjorn Ommer, 'Taming Transformers for High-Resolution Image Synthesis' (2021) <<https://arxiv.org/abs/2012.09841>> accessed on 19 April 2022

Alec Radford and others, 'Learning Transferable Visual Models From Natural Language Supervision' (2021) <<https://arxiv.org/abs/2103.00020>> accessed on 19 April 2022



*Jamaican Dinner*



*Rastaman drinking a coconut*



*Usain Bolt in style of Picasso*

### *2.3 Literature*

In the field of AI, generating works incorporating text usually involves the use of models that can represent sequences of words. These are usually dubbed language models - one such example is the LSTM. Of late the transformer architecture has become the de facto architecture for generating



text. This architecture was used on models such as BERT<sup>25</sup> and GPT2.<sup>26</sup> The latter was created by the research group OpenAI and showed impressive results in creating short stories and poems and a writing in the style of William Shakespeare. GPT2 at the time was one of the largest language models with 1.5 billion parameters. Today GPT-3<sup>27</sup> is the golden standard for text generation. It is an autoregressive language model trained on a corpus of 100's of billions of words with over 175 billion parameters making it one of the largest language models in existence. GPT-3 consists of a neural network called transformer that is trained to predict the next likely word following a sequence of words. GPT-3 is able to auto generate coherent text of many forms which include poetry, prose, essays and even code. Specifically, it is capable of what is called zero shot/one shot learning which means you only need to provide a few examples and GPT-3 will be able to perform that task. For example, if one wants to produce works in the style of William Shakespeare, (s)he only needs to provide one or two snippets of Shakespeare's work and GPT-3 would be able to create its own work in the style of the famous English playwright.

In the same vein, our research group decided to do the same with Jamaican poems written in the style of a famous Jamaican poet, the late Louise Bennett Coverley. The task to perform was to generate a poem in the style of this poet given the title. A few examples of poems of Miss Louise Bennett along with their titles were fed to GPT-3 and from there to generate a new poem in such style, all we had to do was to feed it a new title. The output produced was surprisingly coherent given that the poems used Jamaican Patois which is what is known as a low resource language, meaning there is a small amount of labeled data compared to other languages such as English or French. Below we show a few samples of the poems produced by the model.

### **Tek Home Di Gold**

*Me seh, me seh, me seh,*

*Tek home di gold,*

*Tek home di gold,*

*Tek home di gold.*

*Me no deh pon de ship at all;*

*Me no see how dem carry ball.*

*In fact me never leave Jamaica at all;*

*Me never see de Gold Coast at all.*

*Me seh, me seh, me seh: Take home the gold!*

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<sup>25</sup> Jacob Devlin and others, 'BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding' (2018) <<https://arxiv.org/abs/1810.04805>> accessed on 19 April 2022

<sup>26</sup> Alec Radford and others, 'Language Models are Unsupervised Multitask Learners' (2021) <[https://d4mucfpksyvv.cloudfront.net/better-language-models/language\\_models\\_are\\_unsupervised\\_multitask\\_learners.pdf](https://d4mucfpksyvv.cloudfront.net/better-language-models/language_models_are_unsupervised_multitask_learners.pdf)> accessed 19 April 2022

<sup>27</sup> Tom Brown and others, 'Language Models are Few-Shot Learners' (2020) <<https://arxiv.org/abs/2005.14165>> (2020) accessed 19 April 2022

### **Run Di Race**

*Run di race, run di race,*

*Run di race wid me.*

*Me noh goh tell yuh seh far fi run,*

*But if yuh lose yuh gwaan get a flogging.*

*Yuh better run fast, run fast,*

*Yuh better run fast wid me.*

*Run like a donkey in de race;*

*Run like a donkey in de race.*

\* \* \*

Against this background, by producing various artifacts which can pass off as human creation, we have answered the two main questions we sought to answer with the technical analysis presented in this section. State of the art machine learning models can indeed today produce artistic works closely approximating that originating from Jamaica. The implications for this are far reaching because as the technology improves, art can be produced faster which could mean more revenue for a country such as Jamaica. The challenge faced here is the implications from the ease to which these tools can be used which will only become easier and will require less and less human input until no human input is required.

We will now proceed with analysing the empirical data collected through the consultation ran by our research team. Indeed, we were interested in learning the opinion of all stakeholders on various aspects of AI and its intersection with IP.

### **3. The consultation and data analysis**

A stakeholder consultation was organised by our research team in July 2021 in Jamaica with policy makers, IP lawyers and science and technology stakeholders. Figure 1 shows the breakdown of survey respondents which spanned seven sectors: creative, legal, technology, science, regulatory, policy (including public policy) and academia.

Figure 1.

Which Sector do you represent?  
33 responses

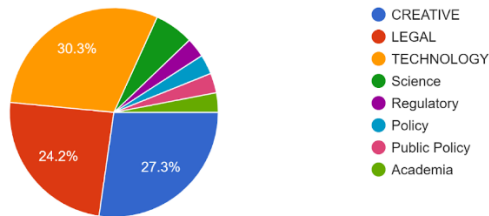
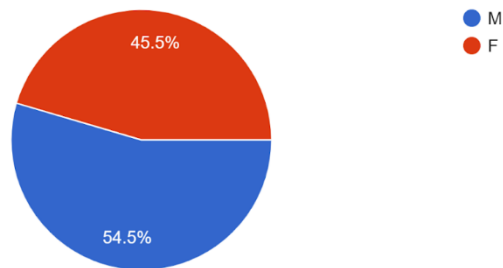


Figure 2 shows the gender breakdown of 18 males representing 54.5% of respondents, and 15 females representing 45.5% of respondents. Figure 3 shows the age breakdown of those surveyed. Almost half of the respondents were in the 26-40 age range (48.5%), 45.5% in the 41-60 age cohort and 6% were in the 0-25 age range.

Figure 2.

Gender  
33 responses



The low number of respondents in the 0-25 age range may have been due to the audience to whom the survey was pitched: that is, college age persons, professionals, policy makers and academics. From the policy perspective, it is important for policy documents to better canvass the younger age cohort who have become more involved in coding,<sup>28</sup> video game design and machine learning.

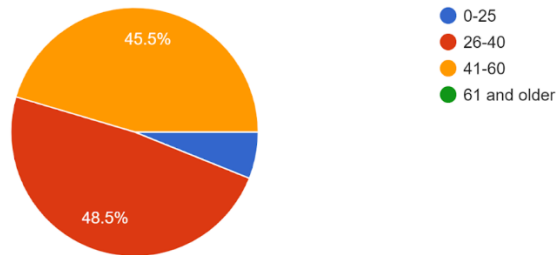
Figure 3.

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<sup>28</sup> 11 year old Jamaican high school student, Dominic Darby in March 2021 entered and won the XPRIZE Connect Code Games: A Global Game-Making Challenge in which he made a video game that used MIT's Scratch coding software – Delano George Bell, '11-Year-Old Jamaican Wins Coding Competition Beating 70 International Rivals' (Jamaicans.com), <[11-Year-Old Jamaican Wins Coding Competition Beating 70 International Rivals \(jamaicans.com\)](https://www.jamaicans.com/news/11-year-old-jamaican-wins-coding-competition-beating-70-international-rivals)> accessed 11 September 2021

### Age

33 responses



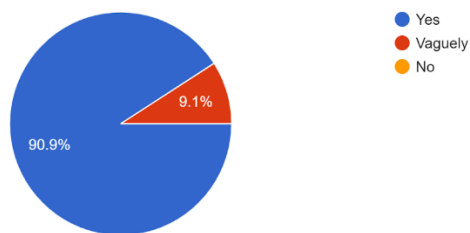
This poll is in sharp contrast to one administered as part of the United Nations Education, Scientific and Cultural Organisation (UNESCO), Caribbean AI Initiative which had a sample size of 29 persons and targeted to youth.<sup>29</sup> The UNESCO poll had a little over 48% of participants under 20 years old, 27.6% between 20-24 years old and 24% over the age of 24. Caribbean wide therefore, more than 75% were youth between 0-24 years and from this youth cohort, over 96% had heard of AI before with 93% having had interactions with some form of AI.<sup>30</sup>

Figure 4 below shows similar results to the regional poll by Simmons and Davis which tested the audience's general knowledge of AI and which showed the majority of respondents (approximately 91%) having some knowledge of AI, with the remaining 9% having a vague idea.

Figure 4.

### Do you know what is Artificial Intelligence (AI)?

33 responses



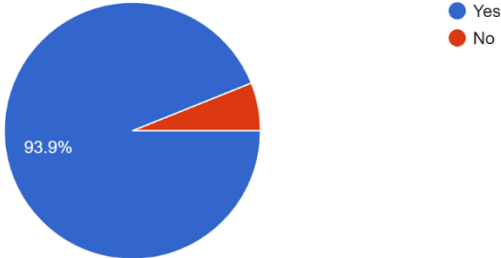
<sup>29</sup> On August 5, 2020 UNESCO launched the Caribbean Artificial Intelligence Initiative aimed at developing a sub-regional strategy on the ethical, inclusive and humane use of AI in Caribbean Small Island Developing States (SIDS). The rationale was that the Caribbean had not sufficiently grasped the import of AI on their respective economies and had not developed the requisite strategies and policies to manage these impacts. See link to the Caribbean AI initiative at <https://en.unesco.org/caribbean-artificial-intelligence-initiative>

<sup>30</sup> Erica Simmons & Andrea Davis, 'UNESCO Caribbean AI Policy Roadmap'. (UNESCO, 2021). Results from stakeholder polls of online Forum 2, *Artificial intelligence: Opportunities to Accelerate Human Progress for Sustainable Development*. 18-19 February, 2021.

On the matter of AI being used for creative projects, an overwhelming number, 94% representing 31 of the 33 respondents, knew that AI could be used to create music, art and literature with the remaining 6% being unaware of this capability.

Figure 5.

Do you know if AI can be used to create music/art/literature?  
33 responses



A relatively high number of those surveyed (82% or 27 of the 33 respondents), felt that AI would one day develop a new piece of music or original artwork. Nonetheless as shown in Figure 6, fewer persons, approximately 70% were aware that these same tools could be used to create works in patois as well as reggae or dancehall music indicating less culture-specific knowledge of the applicability of AI in the local (or regional) context.

Figure 6.

Do you know if tools can generate reggae and dancehall, and literary work written in Jamaican creole (patois) ?  
33 responses

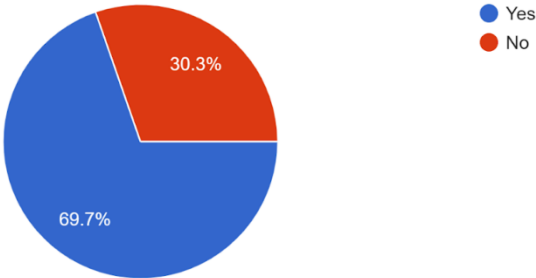


Figure 7a.

Are you aware of any projects that are being done in Jamaica in AI for creatives?

33 responses

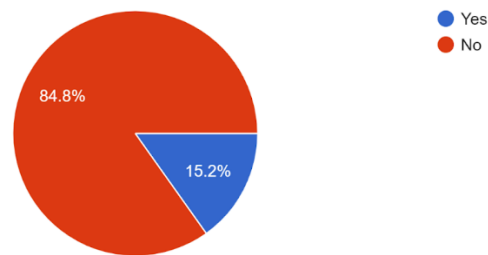
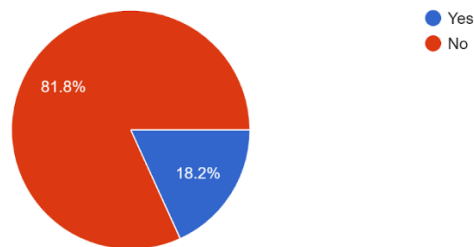


Figure 7b.

Do you know of examples of people profiting from AI generated music/art/literature ?

33 responses



The absence of culturally specific knowledge vis-à-vis AI was borne out by the numbers: knowledge of specific AI creative projects currently undertaken in Jamaica was low, with an overwhelming majority, almost 85% of respondents, being unaware of any current project. Further, only 6% of respondents knew someone personally who was currently profiting or/ profited from AI-generated music, art and literature. Results from the Jamaican study was corroborated in Simmons and Davis' regional UNESCO study.<sup>31</sup>

Figure 8.

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<sup>31</sup> Simmons and Davis (n 30) at 64-65.

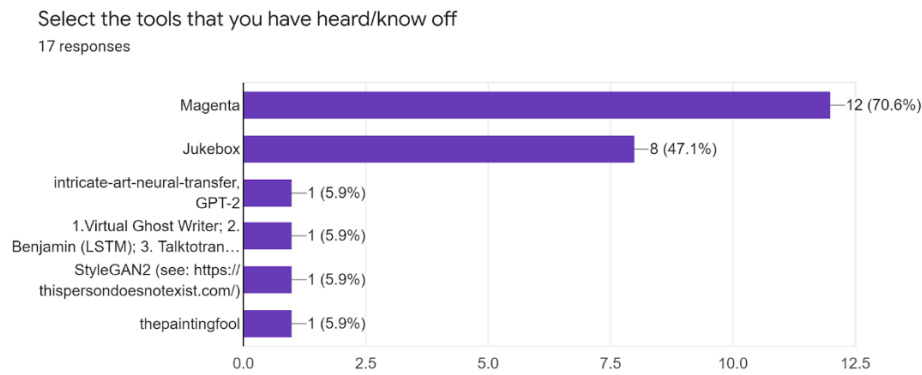
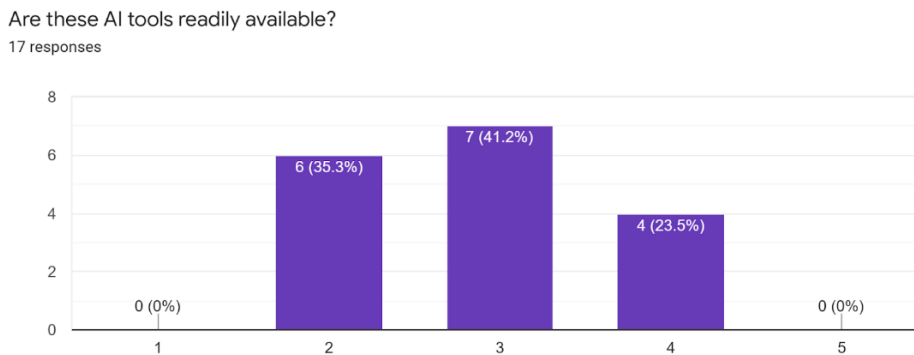


Figure 9.



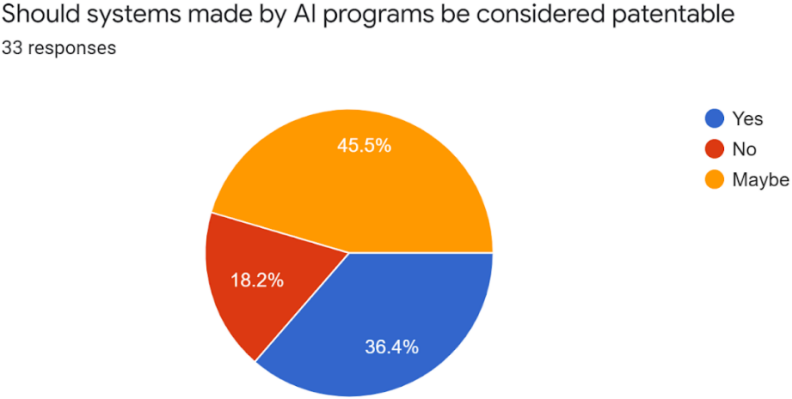
Also minimal was the number of respondents who felt that AI specific software or tools were easily available. Only 12% of respondents thought the tools were readily available which seems incongruous as one-third (30%) of all respondents self-identified as being employed in technology. If science and technology were combined this would account for 36.4% of all respondents as shown in Figure 1 above. This incongruity may indicate that even among technical IT persons, the availability of AI tools (or the perception of their accessibility) is not widespread. This limited knowledge of AI even among technical persons may correlate with the limited knowledge by Jamaican musicians and music personnel about intellectual property rights especially copyright.

The results indicate an urgent need for broad based, ongoing multi-sectoral educational programs across the island related to technology, innovation, IP and scientific research. Sector policies and strategies including those in manufacturing and culture sectors particularly animation, film and craft are silent on the issue of AI and signal an urgent need going forward, to address these policy gaps if they are to be effective in fostering innovation, ingenuity and creativity in Jamaica.

On the matter of patents and AI, an almost equal amount of persons were undecided about whether inventions produced by AI should be patentable (~45.4% or 15 of 33 persons) as those who thought

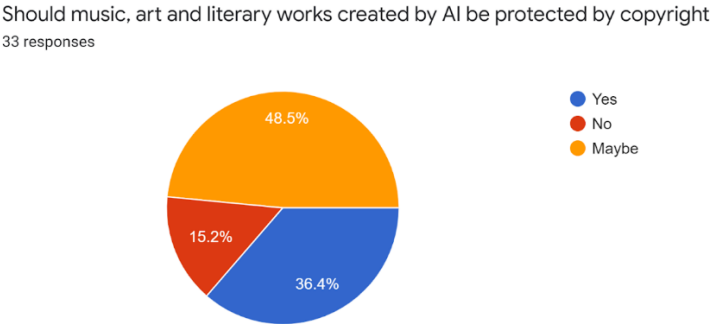
musical, artistic and literary works produced by AI should be copyrightable (48.5% or 16 of 33 persons). See Figures 10 and 11 below. The slight difference may be attributable to the exclusivity of patentable inventions as against copyrightable works, but more research and surveying of a wider cross-section of the population is required to corroborate this attribution.

Figure 10.



When polled on whether systems created by AI programs should be patentable, almost 50% (45.5% ) were unsure, 36.4% responded positively whereas 18.2% disagreed that such systems should be protected by patent law. The large number of persons who were unsure about the patentability of programs made by AI may indicate limited knowledge by respondents of patent law and its applications or may indicate consistency with jurisprudence in most jurisdictions except South Africa that only humans can be listed as an inventor on a patent application.

Figure 11.



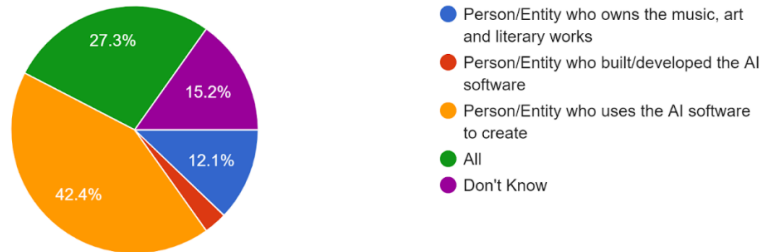
In relation to whether music, art and literary works created by AI should receive copyright protection, 48.5% of respondents were unsure, 36.4% answered affirmatively and the remaining 15.2% thought such works should not be copyrightable. Figures 12 and 13 graphically illustrate respondents' answers on specific areas of ownership by posing the following questions: 1) Should



music, art and literary works created by AI be protected by copyright? 2) Should systems created by AI be considered patentable?; 3) Should AI which created music, art and literary works own the copyright?; and 4) Who should be responsible if an AI program infringes IP?

Figure 12.

If an AI software creates a piece of music, art and literary works, who should own the copyright?  
33 responses



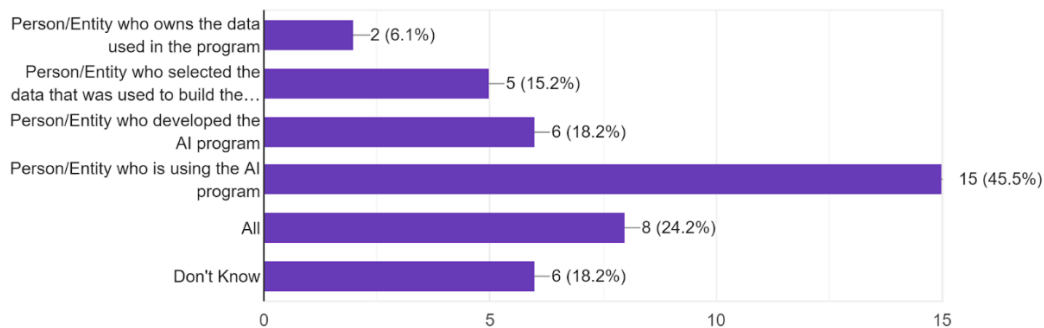
With respect to the query on who should own the copyright if an AI software creates art, 42.4% of respondents indicate that the person/entity who uses the AI software to create should own the copyright; 15.2% did not know; 12.1% responded that the person/entity who owns the music, art and literary works should own the copyright; 3% say that the person/entity who built/developed the AI software should own the copyright, and a further 27.3% say that all parties involved should own the copyright.

Nevertheless it is in the area of infringement that the greatest diversity of opinion becomes evident as shown in Figure 13 below. When asked who should be responsible if an AI programme infringes IP, a little under 50% (15 of the 33 persons polled or 45.5%) believed the user of the infringing programme should be liable. Another 18% thought liability rested with the maker/developer of the AI; still another 15% thought the person or entity who selected the data for use in the infringing AI was liable; whereas 24% thought all persons who had some contact with the infringing programme should be liable. This multiplicity of opinion has legislative consequences as Jamaican copyright and patent laws do not currently address these issues.

Figure 13.

Who would be responsible if an AI program infringes Intellectual Property? Select all applicable answers.

33 responses



As far as infringement is concerned, 45.5% stated that the person/entity who is using the AI program should be responsible if the AI infringes IP; 6.1% believed that the person/entity who owns the data used in the program should be held responsible; 15.2% say that the person who selected the data that was used to build the program should be held responsible. A further 18.2% of the participants believe the person/entity who developed the program should be held responsible for any infringement; 24.2 % of participants believed that all the parties involved should be held responsible, and the remaining 18.2% of participants did not know who should be held responsible for infringement.

While this convenience sampling is too limited to be of any statistical significance, it points to the need for government to conduct more AI specific polling while deploying data and AI literacy programmes to encourage citizen involvement in technology, innovation and science. The lack of specific knowledge about science, technology and innovation matters is corroborated by the survey result mentioned earlier which showed that a whopping 82% (many of whom were either academics, creatives, policy makers or lawyers) did not know anyone who profited from AI generated music, art or literature (Figure 7b) and only 12% thought AI tools were readily accessible (Figure 9). The Caribbean AI poll on the other hand has shown more optimism, with 83% of stakeholders believing AI would enhance human creativity whereas 17% thought it would undermine human creativity. Additionally, respondents overwhelmingly believed the benefits of AI (81% of respondents) outweighed the risks (19% of respondents) to Caribbean sustainable development.<sup>32</sup>

The survey also focused on the thoughts of professionals on the subject of AI. The survey showed that a resounding 90.9% of survey participants, had knowledge of AI and what it is. Unlike the Caribbean AI survey, respondents in this survey were not polled on links to development but rather on connection to creativity. Undoubtedly broad based questions such as that employed by the

<sup>32</sup> Simmons & Davis (n 30) at 63

Caribbean AI team on thoughts on the correlation between AI and human creativity would have been useful and should be considered a suitable question for any future polling.

#### **4. AI and Jamaican IP Law**

Jamaican copyright and patent laws do not explicitly make provision for protection of works or inventions created by AI.

The Jamaican Copyright Act 1993 does include a provision on computer generated works. Section 2(1) states that in case of a literary, dramatic, musical or artistic work which is computer-generated the author shall be “the person by whom the arrangements necessary for the creation of the work are undertaken”. This provision mirrors section 9(3) of the UK Copyright, Designs and Patents Act 1988, on which the Jamaican law was modeled and can be found in the copyright acts of other common law jurisdictions such as Ireland, India and Hong Kong. Section 2(1) of the Jamaican Copyright Act also defines a computer-generated work as one created by a computer with no human author, and Section 10(4) clarifies that the protection lasts for 95 years from the end of the calendar year in which the work was made.<sup>33</sup> This provision unambiguously applies to AI-produced output.

What is less clear, is how can such a work, devoid of human authorship be deemed to be original for the purposes of copyright protection.<sup>34</sup> The statute applies a legal fiction that, the author of computer generated works is not the person who has directly generated the output, but has simply carried out the arrangements necessary for the work to come into existence. This approach clearly departs from the anthropocentric and human orientation of copyright regimes. It has also been held that such a provision is an exception to the requirement of originality, since the works in question do not “derive” directly from a human author.<sup>35</sup> Arguably, this legislative tactic reflects an economic approach to resolving the issue of rewarding the investment made in bringing the copyright work into existence and eventually into the public domain when protection expires.

Conceivably, an alternative approach, could be to broaden the concept of author<sup>36</sup> to make accommodation for the reality of how works created by intelligent machines are achieved. Doubts persist about who has made the necessary arrangements for production of the algorithmic work: the programmer? The user? The data provider or trainer? Or potentially all or some of them so as

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<sup>33</sup> Copyright Amendment Act 2015, s 5.

<sup>34</sup> Jani McCutcheon, 'The Vanishing Author in Computer-generated Works: A Critical Analysis of Recent Australian Case Law' [2013] 36(3) Melbourne University Law Review 915

<sup>35</sup> Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' [2017] 2 Intellectual Property Quarterly 169

<sup>36</sup> The need for an expansion of the concept of author has been acknowledged for long time in legal scholarship, including in the US since the 1980s: see Timothy Butler, 'Can a Computer be an Author - Copyright Aspects of Artificial Intelligence' [1982] 4(11) Hastings Communications and Entertainment Law Journal 707; (noting that “[w]hen courts find that a given product of AI software is authored by machine rather than a person, the court should presume the existence of a fictional human author”).

to give rise to joint authorship? In this regard, these provisions are unconstructive. Consequently, if a dispute arises in Jamaica about authorship of a computer-generated work, the courts will likely have to decide who amongst several subjects has made the necessary arrangements.

As it relates to patents, Jamaica promulgated a new Patents and Design Act in 2020,<sup>16</sup> which entered into force on February 11, 2022. This statute was implemented to give effect to Jamaica's international obligations, aligning the country's IP law regime with the minimum standards of protection stipulated in international treaties, in particular the TRIPS Agreement and the Patent Cooperation Treaty.<sup>37</sup> The statute is silent on whether AI-produced inventions are patentable or whether machines can be considered as inventors under Jamaican law. More importantly, the Act does not include a definition of "inventor" at all.

Section 3 of the Act states that "Whenever any person...alleging that he has invented... ", such person will be entitled to a patent. This is significant because the Act seemingly grants protection to the "person" on the presumption that a human is inherently involved. The Act does not describe a "person" to include AI or machines, which may suggest that AI and / or machines are excluded from the protected genus. Section 9 of Act also appears to have the same effect, because subsection 1 explains that, "An application for a patent may be made, either alone or jointly by any of the following persons...". Throughout that section the word 'person' is mentioned seven (7) times and there is no provision written which expands the definition or interpretation of the word "person" to include a machine. Sections 10(3) and (4) of the Act highlight this point, as it states that if the applicant for a patent is not the inventor, then the application must contain a declaration of the name of the person the applicant believes to be the inventor, and a statement justifying the right of the applicant who is not the inventor (to apply for and be granted the patent). Reading the statute as a whole, it can be deduced that the wording of these provisions conveys an unequivocal legislative intent to confer legal rights to human beings exclusively, and not machines.

Such contextual interpretation of Jamaica's Patent and Designs Act, has also been embraced by the European Patent Office,<sup>38</sup> the UKIPO<sup>39</sup> as well as courts in England,<sup>40</sup> the US<sup>41</sup> and New Zealand<sup>42</sup> in the well-known DABUS cases. In DABUS, Dr. Stephen Thaler filed patent applications with several patent offices claiming a plastic beverage container (the first invention) and a flashing beacon light intended to be used in search and rescue missions (the second invention). Thaler always designated the machine DABUS as inventor. However, the examiners and courts, in all these proceedings, did not accept the designation of DABUS as the inventor and

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<sup>37</sup> Dianne Daley McClure, 'Jamaica: From 1857 To 2022 – Jamaica Takes A Quantum Leap Into A 21st Century Patent System' (Mondaq 18 January 2022) <<https://www.mondaq.com/patent/1151522/from-1857-to-2022-jamaica-takes-a-quantum-leap-into-a-21st-century-patent-system?>> accessed 19 April 2022

<sup>38</sup> Grounds for the EPO decision of 27 January 2020 on EP 18 275 163.

<sup>39</sup> United Kingdom Intellectual Property Office BL O/741/19

<sup>40</sup> Thaler v Comptroller General of Patents, Designs and Trade Marks [2020] EWHC 2412 (Pat), [2021] EWCA Civ 1374

<sup>41</sup> Thaler v Hirshfeld, 1:20-cv-903(LMB/TCB) (E.D. Va. Sep. 2, 2021).

<sup>42</sup> IN THE MATTER of patent application no. 776029 in the name of Stephen L. THALER [2022] NZIPOPAT 2

rejected the applications. They did so by noting that the DABUS applications did not feature human beings as inventors, and that legal protection of inventions was predicated on the inventors being human beings. In light of this case law, one cannot rule out that a similar outcome may also be reached by a Jamaican court in a hypothetical patent case involving an AI generated invention. This is not certain though, as in other jurisdictions – namely, in South Africa<sup>43</sup> and previously Australia -<sup>44</sup> Thaler’s patent applications designating DABUS as inventor have been affirmed. Thus, comparative case law on this issue is in flux and still evolving.

## 5. Jamaica’s science and technology policy framework

It is necessary to analyse Jamaica’s science and technology policy framework, and its convergence with culture and creative industries policy in order to assess Jamaica’s readiness for advancing and protecting not just AI but data and communication proliferation broadly. To do so, the lessons of copyright and its links to the island’s most famous creative export – music, must be examined to glean an understanding of the opportunities and challenges of constructing and implementing technology/AI-focused policies. Jamaica’s science and technology environment is replete with policies to enable technology development. In this regard, the Government of Jamaica took affirmative steps to recognize the importance of technology and innovation pre-independence<sup>45</sup> by establishing the Scientific Research Council (SRC). Legislation to cement the SRC was promulgated in the Scientific Research Council Act of June 16, 1960.<sup>46</sup>

The SRC’s mandate is to foster the development of scientific research, be a repository of scientific information, and facilitate the development, application, transfer and or improvement of technology of such research for the benefit of all of Jamaica.<sup>47</sup> The Act also enables creation of new industries and the encouragement of collaborative technical processes with stakeholders. In addition to the SRC, Jamaica’s technology policy arsenal consists of the 2009 ICT Sector Plan 2009-2030 for the Vision 2030 National Development Plan; the 2011 Information, Communication and Technology (ICT) policy developed by the Office of the Prime Minister; the 2017 ICT Policies, Standards and Guidance (PSG) Manual issued by the Office of the Chief Information Officer and which was a part of the ICT transformation process across government; and the 2019 Science Technology and Innovation (ST&I) policy developed by the Ministry of Science, Energy and Technology (MSET). Also, in June 2021, researchers Erica Simmons<sup>48</sup> and

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<sup>43</sup> Steven M. Sharpe, ‘Worldwide: South Africa And Australia Tackle AI Inventorship In Patents’, (30 December 2021) <<https://www.mondaq.com/southafrica/patent/1146024/south-africa-and-australia-tackle-ai-inventorship-in-patents> > accessed March 1, 2022.

<sup>44</sup> Thaler v Commissioner of Patents [2021] FCA 879. Yet, in April 2022 the Federal Court of Australia overturned such ruling, clarifying that AI cannot be considered as inventor (Commissioner of Patents v Thaler [2022] FCAFC 62).

<sup>45</sup> Jamaica achieved independence from Great Britain on August 6, 1962.

<sup>46</sup> The latest amendment to the Act was January 1, 2007. See <https://moj.gov.jm/laws/scientific-research-council-act> for the full text

<sup>47</sup> See additional information at <https://www.mset.gov.jm/2019/06/20/scientific-research-council/>

<sup>48</sup> Erica Simmons is Executive Director at the Centre for Digital Innovation and Advanced Manufacturing, Caribbean Maritime University in Jamaica

Andrea Davis<sup>49</sup> authored the UNESCO Caribbean AI Policy Roadmap in collaboration with the Broadcasting Commission, Caribbean Artificial Intelligence Initiative and UNESCO<sup>50</sup> thereby adding to the body of policies and strategies with the latter being the most relevant for this study.

Altogether, the aforementioned policy documents were designed to enable data harmony, policy integration and legislative reform in the public sector, yet government oversight of science, technology and innovation is dispersed and fragmented thereby creating policy incoherence. According to UNESCO, AI technology is based on three basic components: dynamic data, decision making based on machine learning algorithms, and prompt processing which is in turn reliant on strong, fast and efficient computing and communication resources.<sup>51</sup> The Jamaican ecosystem as laid out earlier is stymied by the fragmented structure as no single body (or Ministry) has responsibility for technology, data and innovation and data organization and communication across the government system.

In addition, fast and efficient communication of data based on machine learning algorithms is further undermined by under-resourced and inefficient structures and insufficient dynamic data that ought to be used as a critical decision-making tool in the public policy sphere. On its face, the Ministry with responsibility for science and technology has oversight of this area that includes new and emerging technologies, while the Office of the Prime Minister manages sectoral programmes and projects in animation and gaming and presumably AI. The question of who would drive AI is an unanswered question given the fragmented approach outlined above. As such, UNESCO's statement that policies assist to define the space within which AI technology is based, illumines major infrastructure and communication gaps in the Jamaican policy scenario that if ignored may hamper implementation of robust AI systems.

If however we accept UNESCO's position of three basic components on which AI technology is based, Jamaica has made significant strides in implementing technologies to support a digital business environment: a relatively advanced ICT infrastructure with 4G LTE telecoms networks; a deep penetration of smart device availability and usage with 112 per cent mobile subscriptions or 3.24 million devices from a population of 2.9 million;<sup>52</sup> a financial services regulatory framework with considerable maturity and a growing appetite for entrepreneurial and even intra-preneurial innovations and creativity. Despite these strengths, weaknesses in the system relate to the absence of a national innovation system and no formalized platform for integration of rapid

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<sup>49</sup> Andrea Davis is an IP and Creative Industries Consultant as well as the founder and owner of the creative brand, International Reggae Day.

<sup>50</sup> United Nations Educational, Scientific and Cultural Organisation (UNESCO) is an agency of the United Nations established in 1945 to build peace through education, the sciences and culture. For additional information see [UNESCO in brief - Mission and Mandate](#).

<sup>51</sup> UNESCO, 'Artificial Intelligence: examples of ethical dilemmas' <<https://en.unesco.org/artificial-intelligence/ethics/cases>> accessed on 19 April 202

<sup>52</sup> HootSuite data accessed at <https://www.slideshare.net/DataReportal/digital-2019-jamaica-january-2019-v01>.

technology transfer and a fragmented sector with inadequate coordination.<sup>53</sup> The National Science, Technology and Innovation policy also identifies as a major threat, the limited capacity to generate and protect IP.

Because the technology behind AI is standard ICT which is based on collecting, storing, processing and communicating data<sup>54</sup> a review of Jamaica's ICT policy is critical as are policies that enable communication and processing of data. The Records and Information Management (RIM) policy for example provides guidance on the treatment of technological tools within the public sector and the Vision 2030 National Development Plan Goal 3 Outcome 11 speaks to deepening the application of science, technology and innovation for the benefit of national development.<sup>55</sup> While none of the abovementioned policies have specific strategies for public sector AI or even a dedicated focus on AI, the broad policy statements related to 'ICT and digital technologies,' indicate a desire to incorporate new and emerging technologies into the policy making and development process. Accordingly, the OECD believes a separate AI strategy for the public sector remains critical as it allows for seamless integration into the entire policymaking and service design process.<sup>56</sup>

It is expected that by 2030 AI will generate between US\$13-15.7 trillion<sup>57</sup> in added value with concentrations of economic gains in China and North America representing 70% of AI's global economic impact. AI, says UNESCO, has a "winner takes it all" dynamic that needs to be regulated as concentration of AI in the hands of few high-income countries will likely leave developing countries far behind. Developing countries, it is suggested, will not benefit or benefit very little from AI technologies and will lack ownership of such technologies.<sup>58</sup> This conclusion is corroborated by Price Waterhouse Coopers' AI and Business report that the biggest AI gains will be in China with a 26% boost to GDP by 2030, a 14.5% boost for North America equivalent to \$10.7 trillion, which will account for almost 70% of the global economic impact.<sup>59</sup>

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<sup>53</sup> Ministry of Science Energy and Technology, 'National Science Technology and Innovation: Catalysing National Development 2019-2030' (2019) 15.

<sup>54</sup> UNESCO, 'Preliminary Study on the Ethics of Artificial Intelligence' (February 26, 2019) Paris. From SHS/COMEST/EXTWG ETHICS-AI/2019/1.

<sup>55</sup> Planning Institute of Jamaica, 'Vision 2030 Jamaica - National Development Plan' (2009).

<sup>56</sup> Jamie Berryhill and others, 'Hello, World: Artificial Intelligence and its use in the public sector' (2019) OECD Working Papers on Public Governance. Vol. 36 <<https://doi.org/10.1787/726fd39d-en>> accessed August 2021

<sup>57</sup> Global management consulting firm McKinsey believes AI will deliver US\$13 trillion in global economic activity by 2030 whereas Pricewaterhouse Coopers (PwC) extrapolates it will be US\$15.7 trillion by 2030. Tech investor Tej Kohli believes however the gain will be much more guesstimating AI's impact at over US\$150 trillion by 2025. See also Andrew Cave's article. *Can the AI Economy really be worth \$150 trillion by 2025? in Forbes Magazine, June 24, 2019 accessed online at <https://www.forbes.com/sites/andrewcave/2019/06/24/can-the-ai-economy-really-be-worth-150-trillion-by-2025/?sh=365c0dc3bf41>.*

<sup>58</sup> UNESCO, 'Elaboration of a Recommendation on the ethics of artificial intelligence'. Paris, n.d. Web page. 16 August 2021, available in UNESCO. <https://en.unesco.org/artificial-intelligence/ethics>.

<sup>59</sup> Anand S. Rao & Gerard Verweij, 'Sizing the Prize - what's the real value of AI for your business and how you can capitalise?' (PwC 2017) <<https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf>> accessed 26 September 2021

Other discernible disjunctures exist in the areas of IP and creative industries policy and legislation, with Jamaicans owning very little of the music technologies on which the culture is dependent.<sup>60</sup> Coupled with this is the inadequate inclusion of AI specifically linking its intersection with creativity in the culture and creative industries policy framework. It is clear therefore that any mishandling of AI technologies in the Caribbean and the Global South poses a grave threat to tourism dependent small island developing economies such as Jamaica that have yet to develop and implement disruptive and forward-thinking programs, concepts, policies and platforms that fast track the development of a Caribbean technology economy.<sup>61</sup>

Music and the history of copyright in Jamaica therefore provide an appropriate case study for how AI may practically work in Jamaica. Despite the popularity of reggae music, copyright legislation has not been sufficient to protect musicians and artists, and Jamaica earns very little from the cross border trade in this cultural product.<sup>62</sup> Copyright for example creates an artificial scarcity<sup>63</sup> that would have been deleterious to Jamaican ingenuity and creativity in the earlier years of its music production.<sup>64</sup> Indeed, Howard argues that the practice of open domain<sup>65</sup> in the Jamaican music industry has effectively discredited the economic defense of the copyright philosophy. He noted that “without consistent economic motivations, the Jamaican creative imagination has never stalled.”<sup>66</sup> It may be wise therefore to carefully examine the genesis of human ingenuity in Jamaica especially in the context of music and sound system culture and how it has, time and time again, resisted linear approaches and characteristic patterns of development.<sup>67</sup> Simmons and Davis posit that the works produced by leaders in art, music, film, fashion and sport across the region show the national, economic and social importance of Caribbean creativity which can be contextualized within the rubric of ‘thought data’, ‘physical data’ and ‘cultural data’. Within this construct they argue, care should be taken for AI to be deployed to enhance and amplify rather than to cannibalize human creativity.<sup>68</sup>

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<sup>60</sup> Denis Howard, ‘Copyright and the Music Business in Jamaica - Protection for Whom?’ (2009) 4 *Revista Brasileira Do Caribe* 503. See also, Keith Nurse. *Caribbean Music Industry*. Report prepared for Caribbean Export Development Agency. St Augustine: Institute of International Relations University of the West Indies, 2001.

<sup>61</sup> Prime Minister Mia Mottley of Barbados in an Inter-American Development Bank seminar on the impact of COVID-19 on the Caribbean region entitled, “Time to Pivot: The Caribbean As a Global Leader” accessed at <https://youtube.com/watch?v=Dxb6tH4slql>.

<sup>62</sup> See for example, Christiaan De Beukelaer and Kim Marie Spence, *Global Cultural Economy* (London Routledge 2019) Suzanne Burke, ‘Cultural Policy in the age of multilateral trade agreements: The Case of the Caribbean’ *International Journal of Cultural Policy* (n.d.): 1-20; Howard (n 60).

<sup>63</sup> David Hesmondhalgh. ‘Cultural and Creative Industries’ in Tony Bennet and John Frow (eds) *The SAGE Handbook of Cultural Analysis* (London: Sage Publications 2008)

<sup>64</sup> Jason Toynbee, ‘Copyright and the Conditions of Creativity: Social Authorship’ (2008) CRESC Open University Working Paper 60 (2008); Howard (n 60).

<sup>65</sup> This term coined by Howard (n 60) at 512, means “an environment devoid of copyright enforcement and, more significantly, was characterized by the exploitation of creators who were not aware of copyright protection nor was concerned with its implications with regard to its economic benefits.” Copyright protection was not paramount among the creative class who practiced their craft in a communal environment. The emphasis of lyricists and composers was not on ownership of lyrics and music.

<sup>66</sup> Howard (n 60) at 525.

<sup>67</sup> Toynbee (n 64).

<sup>68</sup> Simmons & Davis (n 30) at 2.



Polling from the Jamaican AI and IP workshop we organized in July 2021 saw respondents split on copyright ownership. As mentioned, 42.2% believed that the person or entity who uses AI to create a piece of music, art or literary work should own the copyright, a low 3% believed the person who developed the software in the first instance should be owner, 27% believed all the persons/entities involved in creation should own the copyright whereas 15% did not know who should have ownership of the copyright. Examples of “the Next Rembrandt” AI project<sup>69</sup> or the completion of the last two movements of Schubert’s 8<sup>th</sup> symphony<sup>70</sup> all pose the same questions of ownership and the dilemmas associated with human and machine creativity as encapsulated in the issue of copyright. For the music sector in Jamaica and indeed the rest of the Caribbean, AI’s introduction in the industry is a double-edged sword as while technological advances bring deeper more multifaceted representations of scores and sound, more intelligent sound analysis systems, new and interesting compositional rule structures among other things<sup>71</sup> that are useful in creating copyrightable works, ethical questions such as AI’s non-neutrality, embedded or inserted bias, surveillance practices for data gathering and concerns around fairness still arise and are downsides to AI and these rapid technological shifts.<sup>72</sup> The results from the sampling outlined above show less concern from the general population than from experts who reveal skepticism toward artificial intelligence especially in relation to ethical considerations.<sup>73</sup>

Simmons and Davis caution that AI’s integration in all aspect of Caribbean life must not compromise human creativity which is the region’s most valuable resource.<sup>74</sup> Yet respondents in our recent Creative AI forum, seem not to be sufficiently seized with the urgency the new data landscape presents. When asked if the future of the creative landscape will be shaped by AI based data/algorithms, a little over half (17 of the 33 respondents) or 52% were unsure, 42% believed it will be shaped by AI while 6% did not think the future landscape will be shaped by AI. This result is consistent with Simmons and Davis’ 2021 study as well as the 2017 PwC report which posited that the net impact of automation on total employment would be unclear and while productivity gains may see increases in pre-tax income, the benefits may not be evenly spread across income groups.<sup>75</sup> Survey respondents when asked about the future of creative work, and when asked whether AI will replace creative persons, 70% believed it would

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<sup>69</sup> See the Next Rembrandt Project at <https://www.nextrembrandt.com/>.

<sup>70</sup> This project was led by Chinese ICT corporation Huawei: see the webpage at <https://consumer.huawei.com/au/campaign/unfinishedsymphony/>.

<sup>71</sup> Curtis Roads, ‘Artificial Intelligence and Music’ (1980) 4(2) Computer Music Journal 13 <<https://www.jstor.org/stable/3680079>> accessed 12 September 2021

<sup>72</sup> UNESCO, ‘Artificial Intelligence: examples of ethical dilemmas’ <<https://en.unesco.org/artificial-intelligence/ethics/cases#art>> accessed 24 August 2021.

<sup>73</sup> UNESCO, ‘Preliminary Study on the Ethics of Artificial Intelligence’ (26 February 2019) Paris, SHS/COMEST/EXTWG-ETHICS-AI/2019/1 .

Simmons & Davis (n 30) at 16-19.

<sup>74</sup> Simmons & Davis (n 30) at 3.

<sup>75</sup> Richard Berriman, ‘Will robots steal our jobs? The potential impact of automation on the UK and other major economies’ *UK Economic Outlook* March 017: 30-59.

not, 18% were uncertain whether it would, and a close 12% believed AI will replace creative persons in the future. These responses are inconsistent with the response provided when asked whether AI could one day generate a new genre of music, a new piece of music or literary work as an overwhelming 81% of respondents thought that AI could do this. The responses show ambivalence about AI and its possibilities, displaying optimism based on past information of the ability of AI to create new work, while simultaneously recognising creativity as a peculiarly *human* endeavour. From a policy perspective these results indicate the necessity for targeted data and information literacy programs across Jamaica as a multi-sectoral priority.

## **Conclusion**

As just highlighted, Jamaica's science and technology policy framework presents both opportunities and challenges. On the one hand, the island has a mature ICT, financial and regulatory infrastructure, widespread mobile and broadband penetration amidst a multiplicity of data, telecommunications and information policies, while on the other hand policy incoherence and fragmentation of said science, technology, data and communication across the public sector stymies development of AI that thrives in an environment of efficiency and dynamic data.

The survey conducted across different sectors (creative, legal, policy, science and technology) reveals ambivalence about AI and the complex socio-creative and legal ecosystem within which it operates which may be attributable to the fact that 94% of the persons surveyed were between 26 and 60 years. This result is in contrast to a Caribbean-wide AI youth survey that shows a 81% optimism rate about the value of AI to sustainable development among persons 0-24 years, a positive result for policy makers as it reveals increased interaction by youth with an understanding of technology and its potential benefits to society.

The survey results indicate that priority should be given to broad based, ongoing multi-sectoral educational programs across the island related to technology, innovation, IP and scientific research. Consideration is to be given to the innovative approaches of Jamaica's creative and innovative industries that developed in an unconventional manner which may hold keys to how AI and technology broadly should be deployed within this complex environment. Sector policies and strategies including those in manufacturing and culture particularly animation, film and craft though silent on AI, signal an urgent need going forward, to address these data and policy harmonisation gaps if they are to be effective in fostering innovation, ingenuity and creativity in Jamaica.

On the legal side, Jamaica seems to be sufficiently prepared to accommodate the AI revolution via its copyright law. Indeed, copyright in computer generated works (which include AI produced output) is protected in Jamaica, with the author being identified as the person who made the

necessary arrangements. Only a few other jurisdictions in the world have incorporated a similar provision. This may make Jamaica an attractive destination for AI investments. It is more uncertain however whether patent law is able of accommodating AI created inventions. As we have seen, the Jamaican patent act identifies the inventor as a “person”, which may make difficult the patentability of AI output. Time will tell if algorithmic inventiveness finally finds “hospitality” within the Jamaican patent law of the future – and this may also depend on the evolving case law or legislative changes in other influential jurisdictions.