Digital Artistic Music Ecosystem (DAME): A Research Proposal

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1. Introduction

1.1 Background

Remember the days of bulky CD players and scratched cassettes? The advent of the digital era has brought about a complete transformation in our approach to both the consumption and immersion in music, altering not only the process of its creation but also the means by which it reaches our auditory faculties. This digital revolution, while offering a world of music at our fingertips, has also brought about unique challenges. Streaming platforms like Spotify and Apple Music dominate the scene, offering vast libraries of music. However, these platforms often raise concerns for artists regarding their fair share of the pie. Moreover, establishing significant associations among musicians and their supporters may present challenges, and the endeavour of devising novel methods for both originators and audiences to derive economic gains from music remains an ongoing process.

1.2 Aims

To create the Digital Artistic Music Ecosystem (DAME), which is an innovative mobile application platform that redefines the music experience by facilitating smooth distribution, promoting investment in music, and fostering a mutually beneficial environment for artists and fans.

Below are a list of specific objectives of the project

1. Develop mobile application for the DAME platform to enable seamless distribution of music globally, providing artists with a fair share of profits and empowering them to reach a wider audience.

2. Establish DAME as a vibrant community-building platform where music enthusiasts can connect, share, and invest in music, transforming the traditional music experience into a collaborative endeavour.

3. Redefine music consumption by introducing investment opportunities for fans, allowing them to support their favorite artists financially and share in their success as their music gains popularity by purchasing streaming royalty shares of their favorite artist.

4. Integrate unique features into DAME, such as physical and digital asset cards to represent as a value of the song and can be used for any transactions including trading.

5. Foster a mutually beneficial environment for all participants in the music world, bridging the gap between artists and fans, and promoting a future where music becomes a shared avenue for success and creativity.

2. Literature Review

This review critically examines relevant literature, drawing from diverse sources to comprehend the multifaceted implications of digitalization for musicians and their creative processes. In the history of music distribution, artists find it very difficult to sell, produce, distribute and market their music to the world, especially to their fans because it was capital intensive. The only avenue that's available for artists to be able to do that is to sign a record or a distribution deal that leads most of them in losing their music rights or ownership. Several platforms have been introduced to help artists, especially independent artists to distribute their music and the use of social media to help marketing their music.

Lily Tumbale, (2023) says music has always been part of our daily lives, music has evolved, from live, phonograph, LP Records, Broadcast Radio, Cassette Tapes & Walkman, CDs, MP3 & iPod for Streaming. With technology and internet evolution, the world is more connected and there is a large amount of data being processed every millisecond. Technology and internet evolution made music streaming more popular even though it was quite expensive for fans to purchase or subscribe to music, until youtube opened in 2005 which made music more accessible by just browsing and selecting what they want to listen to..

The main objective is to develop a thorough grasp of the opportunities and problems brought about by the transition from physical to digital formats, taking into account elements like evolving music-making techniques, the rise of digital entrepreneurship, and the significant impact of information systems.

A study by Woods (2023) explored the impact of digital technology on music creation. Throughout his exploration, he unveiled that while these tools have facilitated collaboration

among musicians and expanded their fanbase, they have also given rise to intense competition. According to Woods, current theories of entrepreneurship fall short of explaining the particular difficulties faced by musicians in the digital age. He promotes a critical viewpoint, arguing that analysing this circumstance critically can shed light on how digital technologies, which place a premium on efficiency and logic, can drive artists away. He unpacks their contrasting business models, pricing structures, and unique offerings, laying bare the competitive environment DAME will navigate. Coffey (2016) explores the freemium model's popularity, sparking questions about incentivizing premium subscriptions, and sheds light on artists' concerns regarding fair compensation in the streaming era. This multifaceted understanding gleaned from Coffey's research proves indispensable as we design DAME to address contemporary challenges and foster a robust ecosystem that empowers both artists and fans. Examining Spotify's impact, Casagrande (2021) reveals its disruptive innovation in the music industry. First, they let people pick and choose the music they wanted, like a digital jukebox, instead of buying whole albums. They also switched from selling music like a physical product to offering it as a service, similar to getting access to Netflix instead of buying every movie you want to watch. Using technology, they kept things affordable by cutting out the middleman and making it convenient by letting you listen to your music anywhere.

Kim (2019) investigates how blockchain technology might transform the music business, especially for musicians who frequently receive unfair pay. This innovative technology could:

- Enhance Revenue Distribution: By eliminating middlemen and enabling direct artist payouts, blockchain offers a potential solution to the long-standing problem of inequitable artist remuneration.

- Empower Artists: Smart contracts within the blockchain could empower artists by allowing them to set prices, track usage, and potentially mitigate copyright infringement, granting them greater control over their work.
- Strengthen Fan Engagement: Fans could directly support artists through the platform, fostering stronger connections and potentially unlocking new funding and revenue streams.

While acknowledging concerns about its immediate implementation, Kim (2019) emphasises that careful consideration of industry complexities and user needs could unlock transformative benefits. Beyond addressing fair compensation, blockchain has the potential to create new avenues for funding, revenue, and artist-fan engagement, potentially shaping the future of the music industry.

Maigua Teran's (2019) research demonstrates the feasibility of using blockchain technology to improve the music industry's payment system. The research discovered that Hyperledger was more appropriate for this particular use case owing to its superior capacity for expansion when contrasted with Hyperledger Fabric and Ethereum. The potential benefits include faster artist payments, enhanced transparency, and greater control over work through smart contracts. Despite these, the study suggests a promising outlook for blockchain technology in improving efficiency, transparency, and fairness for artists.

3. Methodological Approach

3.1 Developing the Future of Music

In order to promote an adaptable and iterative development process, DAME uses an agile development methodology. Rapid prototyping is given priority in this method, which also incorporates user feedback and iterative design to continuously improve the platform. For cross-platform functionality, the technical foundation will make use of **Flutter** (a mobile app development framework), guaranteeing smooth accessibility across various hardware and operating systems.

3.1.1 User Onboarding and Content Creation:

Users can sign up through a streamlined process using their credentials.

3.1.2 Decentralised Distribution and Fractional Ownership:

DAME makes use of blockchain technology to enable the songs' decentralised distribution over a range of streaming services. By giving them more control over their creations, this gives creators more power. By selling shares, DAME enables musicians to fractionalize their ownership of their works.

3.1.3 Multi-Sided Marketplace for Trading and Investment:

- Direct sale: Individual shares can be bought directly from creators.
- Group sale: Creators can offer shares to specific groups or communities.
- Trade: Users can trade existing shares amongst themselves through a bot-driven chat feature.

3.1.4 Secure Transactions and User Verification:

To ensure secure transactions and prevent fraud, DAME incorporates a know-your-customer process. This verification process ensures user identities and allows them to link their bank and card information with the platform.

3.1.5 Monetization through Physical and Virtual Cards:

DAME provides a creative way to make money. Requesters are able to obtain virtual or tangible cards that show who owns which song shares.

3.1.6 User Experience Design:

DAME will prioritise crafting an intuitive and engaging user interface. This UI will seamlessly blend music streaming functionalities with financial transactions and social interaction features, fostering a positive user experience.

3.1.7 Testing and Evaluation:

Initial testing will focus on functionality, security, and user experience across both the mobile and web platforms. This includes ensuring seamless operations of music uploads, share trading, and financial transactions. A dummy music project and marketplace will simulate real-world operations, allowing for the evaluation of the ecosystem's efficiency, scalability, and user engagement (Waddell, 2019). Feedback will be collected from a select group of beta testers, encompassing artists, fans, and investors to refine the application before a wider release.

To gauge success, DAME will gather and examine both quantitative and qualitative data: Quantitative data will be collected in the study through metrics on user engagement and transaction volumes, as well as qualitative data from focus groups, interviews or surveys.

In conclusion, DAME aims to build a platform empowering musicians, encouraging community involvement, and providing a seamless and secure experience for all users, with a focus on user centric design and an agile development methodology.
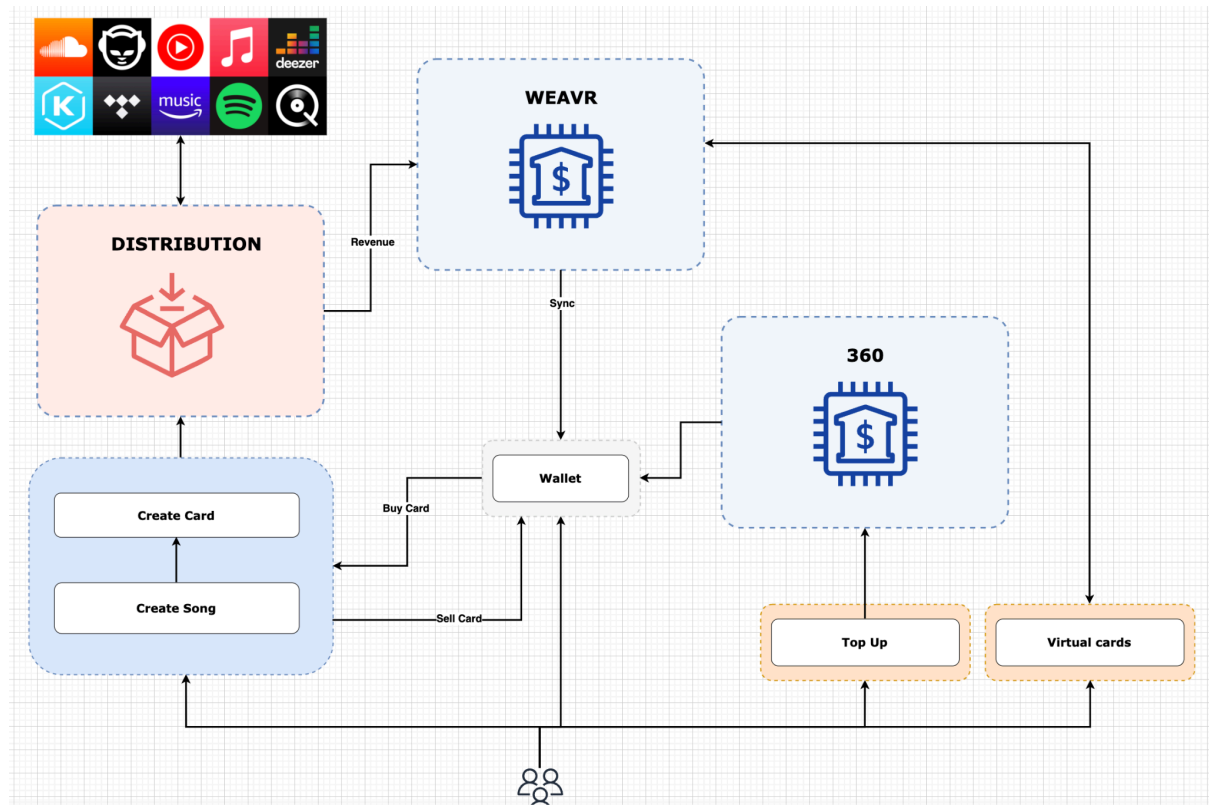
3.2 High level design flow

Figure 1

Figure 1 outlines the integration of music distribution and revenue management through a platform called WEAVR. There are two distinct sets of users: artists and investors.

The distribution part constitutes the uploading of a song, which is by the artist. As the music is created, a digital 'card' representing its digital ID or asset is reproduced, which also serves as a card of the digital song in general. Lastly, the music, which can be linked to the virtual card, then becomes available on different music and social media platforms such as Spotify, Apple music, YouTube, etc. It is through these facilities the song is made available to the listeners and in the end it is where the money is generated.

On the other hand, the Pay360 feature is specifically created to handle the financial management task and also a digital wallet functionality. Adding the Top-up option in the wallet enables the users to deposit extra funds to their wallet in order to make purchases to the digital music card royalties. The 'Virtual Cards' suggests the capacity of the platform to create virtual credit cards that are used for all day to day financial transactions, and thus permitting a clear distinction between various services or for easier tracking of expenses.

4. Technical Aspects

The present state of the music industry is currently experiencing a notable shift, primarily influenced by the progress in technology and the changing patterns of consumer conduct. While creators continue to produce exceptional music, the traditional methods of ownership and monetization often restrict their control and limit their financial potential. DAME, a novel platform built on a decentralised approach, aims to empower artists, unlock new revenue streams, and reshape the music ecosystem.

4.1 Database and Backend

- **Postgres**: This relational database will store user profiles, music metadata, transaction records, and share information. The exemplary strength and capacity for expansion make it well-suited for managing intricate inquiries and guaranteeing the integrity of data.
- **Firebase**: To complement Postgres, Firebase will be used for real-time data updates, user authentication, and storage of media files. Its real-time database will facilitate live updates for shares trading and bidding in the marketplace.
- **Node.js**: The backend logic will be built on Node.js, enabling efficient handling of asynchronous operations and network requests. This environment will support the application's scalability and integration with various APIs for music distribution and third-party services.

4.2 Frontend

The application will feature two interfaces:
- **Mobile App for Artists and Fans**: Built with Flutter for cross-platform compatibility, ensuring accessibility on both iOS and Android devices. The mobile app will allow users to upload songs, purchase shares, and interact with the marketplace.
- **Web Platform for Detailed Analytics and Management**: For artists and investors seeking deeper insights into their investments and music performance.

4.3 Integration

- Integration with Application Programming Interfaces (APIs) provided by Spotify, Apple Music, and various other streaming platforms enables the automation of music distribution through Streaming Platforms API.
- Weavr: To enable the creation of physical/virtual cards linked to users' accounts, allowing for transactions using the wallet funds.
- KYC Verification Service: Integration with a KYC supplier to guarantee user authentication prior to permitting the addition of bank and credit card details.

4.4 Hosting and Deployment

AWS: AWS will host the entire infrastructure, using services like Lambda for serverless operations that react to marketplace events, EC2 for servers, RDS for managing Postgres databases, and S3 for storing music files.

4.5 Data Collection Process

The DAMES's app features user registration, KYC verification, music upload and distribution, shares trading, financial services integration, a chat feature for trading, withdrawals and bank integration, and biometric and passcode security for critical operations. Artists upload songs, which are distributed across major platforms, and users can monetize their music through direct sales, group sales, trading, and auctions. Partnerships with financial services like Weavr facilitate these features.

4.6 Building a Vibrant User Experience

DAME recognizes the importance of a positive user experience:

- Intuitive UI/UX design: DAME prioritises an intuitive and user-friendly interface that seamlessly integrates music streaming functionalities with financial transactions and social features, similar to the emphasis in the reference project.
- Content discovery and community features: DAME may explore implementing features like personalised recommendations and artist profiles.

5. Project Timeline

The undertaking will be carried out during a duration of three months, wherein the initial month will be solely allocated for the purpose of devising strategies, formulating concepts, and commencing the preliminary stages of progress. The subsequent two months will focus on feature implementation, integration, and internal testing and also involve beta testing, refinements based on feedback, and preparation for presentation/launch.
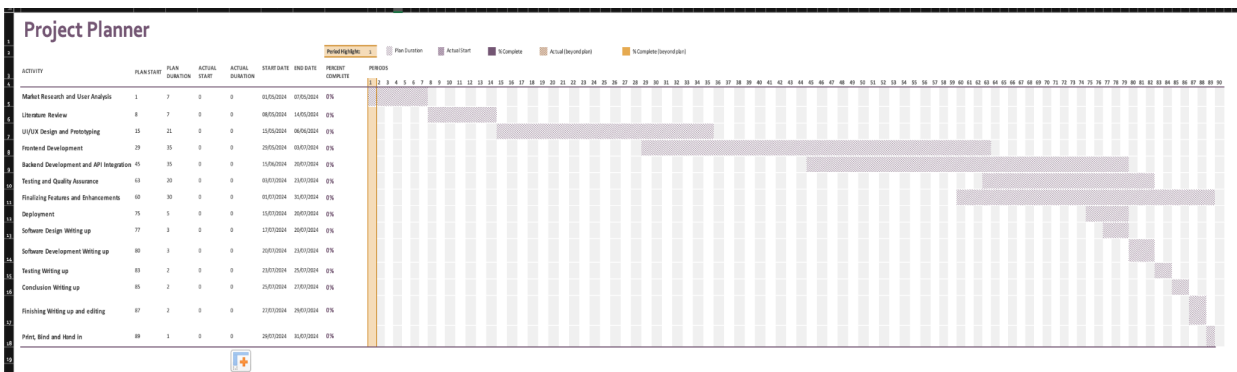

Figure 2

Figure 2 is a screenshot of the Gantt chart outlining the tasks for my project along with the estimated durations. This visual representation illustrates the prospective timeline for completing various project tasks.

Approaching the project of mobile app development in the course of 90 days, it consists of some main stages that are devoted to the creation of an app with an efficient and aesthetically attractive interface. The initial phase of our project is to learn everything possible about our target segment alongside understanding the marketplace as well as the consumers' trends and preferences. This step is made by spending one week in which I can get useful data or a research base to inform my development process.

The next stage is the UI/UX design and prototyping process, which takes me three weeks, having followed the research stage. Here is the field, where I will mostly take care of UI design, UI development, and UI testing in order to demonstrate potential features of the application or service. This phase creates the starting point for the actual development of the frontend, which comes after it.

The frontend development phase encompasses five weeks that include translating the designs into frontend components. I will use the frontend features and integrate them with UI elements and then take care of the responsiveness by building it across devices with different contour and size of screens.

In addition, I will carry out a load of backend development that includes writing server-side logic and API hooking to make the application functional.

The testing and quality assurance of the project belongs to the essential part of the project plan, and attains three weeks. Consequently, in the next step, I will perform complete checking in order to run through the functionality of the app, its performance and compatibility on different devices and operating systems. On the other hand, I will aim to identify any problems and immediately solve them to ensure that the application operates at its finest level.

The trial period is followed by beta testing and obtaining user feedback, which lasts two weeks. This is where I'm going to put the application before the public beta testing, in order to charge up evaluations, correction and improvement, based on the user inputs, I will design the application and I will also spend time making all final amendments as I provide different features and functionality to it.

Once the application is refined based on user feedback, I proceed to the deployment phase, where I will prepare and submit the application for review and approval. This phase is allocated two weeks to ensure a smooth and timely deployment process. Concurrently,I will be finishing the write up and edit, printing and binding then handing in. This phase is initially allocated 2 weeks in order to allow plenty of time, which can be eaten into by previous phases should the need arise. This phase is also scheduled to end well before the hand in date so it can also be expanded should need be.

6. Ethics

The Digital Artistic Music Ecosystem is a platform that endeavours to establish equity, confidentiality, and safeguarding for all those who partake in it. It will manage user data with the utmost caution, guaranteeing conformity with worldwide data protection laws. Moreover, the platform will enforce stringent security protocols for monetary transactions, encompassing well-protected communication channels and adherence to the PCI DSS standards.

Throughout the course of the project, utmost importance will be placed on upholding transparency and fairness. This will be achieved by ensuring that all individuals have equal opportunity to access information pertaining to share sales, auctions, and trades. Revenue distribution will be conducted in a transparent manner, thus obviating the occurrence of disputes and ensuring that artists and investors receive just earnings. The platform will dutifully acknowledge and safeguard the intellectual property rights of music creators, and it will promptly address any instances of unauthorised distribution of copyrighted content.

User consent and autonomy will be provided, with users having control over their personal and financial data. The platform shall be designed with utmost accessibility in mind, ensuring that individuals with impairments can navigate it effortlessly. It will also support emerging artists by providing equal opportunities for music distribution and monetization. These moral considerations go beyond following the law to include creating a platform that values and safeguards its users.

Please see appendix 1 to 2C for the relevant ethics application paperwork.

7. References

Woods, C., 2023. Orchestrating the Ecosystem: How Music Making is Transformed in the Digital Age (Doctoral dissertation, University of Liverpool).

Coffey, A., 2016. The impact that music streaming services such as Spotify, Tidal and Apple Music have had on consumers, artists and the music industry itself. Interactive Digital Media. University of Dublin, pp.195-202.

Casagrande, N., 2021. Spotify: disrupting the music industry (Doctoral dissertation).

 Kim, K.C.H., 2019. The impact of blockchain technology on the music industry. International journal of advanced smart convergence, 8(1), pp.196-203.

Maigua Teran, T., 2019. DIGITAL ASSETS TRANSMISSION BETWEEN ORGANIZATIONS: MUSIC INDUSTRY CASE (Doctoral dissertation, University of Saskatchewan).

Waddell, G., Perkins, R. and Williamon, A., 2019. The Evaluation Simulator: a new approach to training music performance assessment. Frontiers in psychology, 10, p.557.

8. Appendix 1: Ethics Assessment

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Certificate of Completion

This certifies that

Adolf Woru

has successfully completed the CPD Course:

Introduction to Research and Professional Ethics

Delivered by Anglia Ruskin University

Date:

27/03/2024

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9. Appendix 2: Ethics Checklist

9.1. Appendix 2A

Section 2: Research Ethics Checklist (Refer to Section 3 for an explanation of the colour coding.)

N.B. If you are conducting research that involves 'animals and significant habitats', please use the Stage 1 Research Ethics Application Form involving Animals and Habitats (www.anglia.ac.uk/researchethics).

You must provide a response to ALL questions. Please refer to the Question Specific Advice for completing the Stage 1 Research Ethics Application Form for guidance.

	Will your research (delete as appropriate):			
1	Involve human participants?	●	YES	NO ✔
	Utilise data that is not publically available?	●	YES	NO ✔
3	Create a risk that individuals and/or organisations could be identified in the outputs?	●	YES	NO ✔
4	Involve participants whose responses could be influenced by your relationship with them or by any perceived, or real, conflicts of interest?	●	YES	NO ✔
5	Involve the co-operation of a 'gatekeeper' to gain access to participants?	●	YES	NO ✔
6	Offer financial or other forms of incentives to participants?	●	YES	NO ✔
7	Involve the possibility that any incidental health issues relating to participants be identified?	●	YES	NO ✔
8	Involve the discussion of topics that participants may find distressing?	●	YES	NO ✔
9	Take place outside of the country where you work and/or are enrolled to study?	●	YES	NO ✔
10	Cause a negative impact on the environment (over and above that of normal daily activity)?	●	YES	NO ✔
11	Involve genetic modification of human tissue, or use of genetically modified organisms classified as Class One activities?[1].	●	YES	NO ✔

9.2. Appendix 2B

12	Involve genetic modification of human tissue, or use of genetically modified organisms above Class One activities?[2].	🔴	YES	NO ✔
13	Collect, use or store any human tissue or DNA (including but not limited to, serum, plasma, organs, saliva, urine, hairs and nails)?[3]	🔴	YES	NO ✔
14	Involve medical research with humans, including clinical trials or medical devices?	🔴	YES	NO ✔
15	Involve the administration of drugs, placebos or other substances (e.g. food, vitamins) to humans?	🔴	YES	NO ✔

[1] Email **FST-Biologicalsafety.GMO@anglia.ac.uk** for further information.

[2] As above.
2

[3] For any research involving human material you must contact Matt Bristow (matt.bristow@anglia.ac.uk) for further guidance on how to proceed

3

16	Cause (or have the potential to cause) pain, physical or psychological harm or negative consequences to humans?	🔴	YES	NO ✔
17	Involve the collection of data without the consent of participants, or other forms of deception?	🔴	YES	NO ✔
18	Involve interventions with people aged 16 years of age and under?	🔴	YES	NO ✔
19	Relate to military sites, personnel, equipment, or the defence industry?	🔴	YES	NO ✔
20	Risk damage/disturbance to culturally, spiritually or historically significant artefacts/places, or human remains?	🔴	YES	NO ✔

9.3. Appendix 2C

21	Contain research methodologies you, or members of your team, require training to carry out?	🔴	YES	NO ✔
22	Involve access to, or use (including internet use) of, material covered by the Counter Terrorism and Security Act (2015), or the Terrorism Act (2006), or which could be classified as security sensitive?[4]	🔴	YES	NO ✔
23	Involve you or participants in a) activities which may be illegal and/or b) the observation, handling or storage (including export) of information or material which may be regarded as illegal?	🔴	YES	NO ✔
24	Does your research involve the NHS (require Health Research Authority and/or NHS REC and NHS R&D Office cost and capacity checks)?	🟣	YES	NO ✔
25	Require ethical approval from any recognised external agencies (Social Care, Ministry of Justice, Ministry of Defence)?	🟣	YES	NO ✔
26	Involve individuals aged 16 years of age and over who lack 'capacity to consent' and therefore fall under the Mental Capacity Act (2005)?	🟣	YES	NO ✔
27	Pose any ethical issue not covered elsewhere in this checklist (excluding issues relating to animals and significant habitats which are dealt with in a separate form)?	🟠	YES	NO ✔

Please note that the Faculty Research Ethics Panel (FREP) will refer to the Office of the Secretary and Clerk any application where, in the view of the Chair, the proposed research poses a risk of a legal or security related nature to Anglia Ruskin University. The Chair will seek guidance from the Secretary and Clerk before the FREP decides if the proposed research can be granted ethical approval and/or the nature of any special arrangements which need to be put in place.

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[4] The Counter Terrorism and Security Act (2015) and Terrorism Act (2006) outlaws web posting of material that encourages or endorses terrorist acts, even terrorist acts that have occurred in the past. Sections of the Terrorism Act also create a risk of prosecution for those who transmit material of this nature, including transmitting the material electronically. The storage of such material on a computer can, if discovered, prompt a police investigation. Visits to websites related to terrorism and the downloading of material issued by terrorist groups (even from open-access sites) may be subject to monitoring by the police. Storage of this