

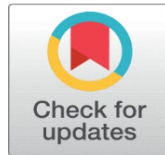
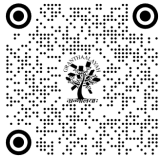
INKLESS IMPRINTS: THE SHIFTING LANDSCAPE OF LITERATURE AND ECO-CONSCIOUS DIGITAL PUBLISHING

Padmapriya P ¹ , Dr. M. Alagesan ² , Ramya B ³ 

¹ Research Scholar, Department of EFL, SRM Institute of Science and Technology, Kattankulathur, Tamilnadu, India

² Assistant Professor, SRM Institute of Science and Technology, Kattankulathur, Tamilnadu, India

³ Research Scholar, SRM Institute of Science and Technology, Kattankulathur, Tamilnadu, India



Corresponding Author

Padmapriya P, pp1672@srmist.edu.in

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ABSTRACT

The Digital era has marked numerous developments in the fields of academics and technology. The fusion of technologies with academics has taken the academic forum to greater levels. In human history, the invention of paper played a significant role in communication and documenting knowledge. This research focuses on how the massive usage of paper is contributing to climate change and attempts to find to what magnitude the effective usage of digital publishing can be the solution to protect the environment. The production process of paper, from cutting down trees, to transportation, creates an accountable carbon footprint, water pollution, waste generation and so on. It is observed that approximately four million books are published in a year, creating the need for 400 million papers (approximately 40000 trees). Thus, this research focuses on digital Publishing, using literature on digital platforms and print-on-demand as remarkable phenomena that benefit academia and the environment.

Keywords: Paper Production, Carbon Footprint, Climate Change, Digital Publishing, And Print on Demand

1. INTRODUCTION

Publishing a literary work involved a lot of time and money before the evolution of digital publishing. In most situations, printing and selling the book has been critical for both the author and the publisher. Though the reader's love for reading the hard copy is a valuable individual consideration, printing the book involves a massive number of papers with immediate concern for environmental exploitation. The approximate publishing could be "Figures range from 500,000 to one million books published annually. However, if you include self-published authors, you're looking at close to 4 million new book titles published each year." (Jess, 2023). A tree can produce "How many pieces of paper in a tree? When you use the πr^2 formula (Area of a circle), it is approximated that an average standard pine that measures 45 feet long and 8-inch diameter produces 10,000 sheets of paper." (Ruark, 2014). If each book carries 100 papers, it would be

400 million papers used for printing the books, and approximately 40000 trees have been used to produce the paper. The numbers are only for the fresh production of books and not the reprints.

The Project of Gutenberg in 1971 had an essential role in keeping the already published knowledge in the form of books into e-books. It was “founded as a volunteer effort to digitize and archive cultural works, to “encourage the creation and distribution of e-books.” Currently, over 50,000 e-books are digitized” (History of Digital Publishing, n.d.). The advent of the Internet and technological developments created a crucial change in the publishing industry. The establishment of the International Digital Publishing Forum (IDPF) “capture the needs of all the stakeholders along the book chain (publishers, technologists, authors, distributors, technology companies, educators, learners, governments, etc.) and to distil them into new standards for the publishing industry to arrive at a single universal format. (History of Digital Publishing). For instance, the development of e-readers, tablets, and smartphones is a new platform for reading beyond the traditional print format.

2. TREES AND TRADITIONAL PRINTING

The connection between trees and conventional printing from an ecological standpoint is a vital factor, particularly in environmental sustainability. Conventional printing methods, which extensively depend on paper made from trees, have significant environmental consequences. “Paper has shaped society for centuries and is considered one of humanity’s most important inventions.” (Furszyfer Del Rio et al., 2022). Though it has been a depository of knowledge for centuries, the production of paper has a huge impact on deforestation and is a way to exploit the environment. Print, Plant &Pulping is a method in which the publishers plant a tree when one tree is cut down and it “is not enough in the long-term due to a variety of factors. One such factor is that only 50% of trees that are cut down actually get turned into paper; most are used as fuel for pulping.” (Done et al., 2022). The fuel causes a major carbon dioxide emission, which is again a factor of environmental degradation.

The pulp and paper industry is among the top five most energy-intensive industries globally and is the fourth largest industrial energy user. This industry accounts for approximately 6% of global industrial energy use and 2% of direct industrial CO₂ emissions.” (Furszyfer Del Rio et al., 2022) contributing to the loss of biodiversity and the disruption of ecosystems. The emission of CO₂ in the paper production process, which involves logging, transportation, and manufacturing, contributes to the carbon footprint. The carbon footprint of an “office paper from cradle-to-costumer is 4.64, 4.74 and 4.29 g CO₂eq per A4 sheet according to, respectively, the ISO 14040/14044 standards, the PAS 2050 and the CEPI framework.” (Dias & Arroja, 2012). The next factor is water usage and pollution in the production of paper. The chemicals that are used in the processing extend their impacts to water bodies “Raw materials are mixed with water in a paper mill to produce fiber suspension. Effluents contain large amounts of fiber, filler, and chemicals (surfactants, bleaching agents, glues, coloring agents, and biocides) that make it hazardous and toxic (Lacorte, 2003).

Furthermore, the printing industry produces substantial paper waste, such as misprints, unsold materials, and end-of-life products. Ineffective recycling or disposal methods can lead to increased landfill waste and worsen environmental strain. It is observed that About 40–50 kg of sludge (dry) is generated in the production of 1 tonne of paper at a paper mill and of that approximately 70 % is primary sludge and 30% secondary sludge. The amount of sludge on a dry mass basis may vary from 20 % in a newsprint mill to 40 % in a tissue mill. (Bajpai, 2014)

Thus, ineffective waste management in the paper production industries causes soil pollution, leading to numerous effects on the living organisms and the environment. Hence, adapting more ecological perspectives in eco-friendly printing technologies is most needed to protect the environment. Implementing digital alternatives to traditional printing can greatly decrease the need for paper. For instance, E-books, online publishing, and digital platforms can reduce the negative impact on forests and natural resources.

3. DIGITAL PUBLISHING

Digital publishing has brought about a significant change in how material is created, distributed, and consumed. This revolutionary phenomenon arose due to technical breakthroughs and changing consumer preferences, starting in the late 20th century and intensifying in the 21st century. Technological progress, particularly the internet and digital technology, has been crucial in enabling the conversion of textual content into digital formats. Online platforms have evolved into hubs for the sharing, disseminating, and discovering written works, promoting a worldwide

connected literary community. The emergence of e-books and digital forms has transformed the storage and distribution of literature, providing authors and publishers with a cost-efficient and effective option compared to traditional print techniques. A self-publishing revolution has intensified the transition, enabling authors to circumvent conventional publishing gatekeepers through digital channels. For instance, Amazon Kindle Direct Publishing and similar platforms allow writers to self-publish and distribute their work. In self-publishing, the author holds control over their literary works, unlike publishing through publishers. It is observed that Academic self-publishing gives the author far greater control. A recent survey of 25,000 academic researchers found that 77% of respondents wanted control over the publishing process. Academic self-publishing gives authors more control over their book's content and appearance, and also enables them to create books that are more experimental. (Sciendo, n.d.)

Digital publishing has facilitated the incorporation of hyperlinks, videos, and interactive elements into textual content, creating a more engaging and interactive experience. It has enhanced the reading experience by offering audiences a more captivating and interactive engagement with the text. It has made literature more accessible by lowering obstacles to entrance. E-books and online articles are either more cost-effective or available for free, expanding their reach to a broader audience. Digital platforms have impacted reading habits by leading people to use digital devices for various information, including news items and full-length books. "The content production, marketing, operating, and consumption are not linear upstream-downstream related any more. Instead, they have fused together, and thus formed a new industrial ecosphere." (Niu et al., 2018) contributing to the growth of digital publishing and beneficial environmental effects. Thus, the increased awareness of the ecological impact of conventional printing and distribution methods has resulted in a greater appreciation of the advantages of digital publishing in minimizing paper usage and waste. However, the rise of digital publishing represents a significant change in the literature industry. Driven by technical advancements, changing consumer habits, and a demand for more accessible and more environmentally friendly content delivery, this transformation continues to influence the publishing industry. It impacts how authors produce and distribute their work, thus altering how readers interact with literature in the digital era.

4. LITERATURE ON DIGITAL PLATFORMS

"Literature is a form of human expression. But not everything expressed in words—even when organized and written down—is counted as literature. Those writings that are primarily informative—technical, scholarly, journalistic" (Rexroth, 2024) contribute to the human world of knowledge in many forms. Before the invention of paper, various materials and methods were used to record and transmit literature from oral traditions to stone inscriptions, clay tablets, papyrus scrolls, birch bark manuscripts, animal skins and parchment, bamboo strips, codex format, ink and quill pens, and silk manuscripts as a medium of writing the information and preserving the knowledge. The invention of paper created a notable revolution in human civilization, history, culture, and communication. It played a significant role in facilitating and preserving knowledge for centuries and paved the way for the development of art, literature, science, and philosophy in various civilizations. Further, the invention of the printing press around 1440 by Johannes Gutenberg revolutionized the production of books, making them more affordable and accessible to a wider audience. The massive production of paper has brought a few endangers to the environment. Thus, the development of technology has brought potential solutions to the problem. For instance, several digital platform companies publish, distribute, sell, and promote literature.

Digital platforms have transformed how we access, consume, and engage with literary work in the constantly evolving world of literature. It transforms "almost every industry today, they are slowly finding their way into the mainstream information systems (ISs) literature. Digital platforms are a challenging research object because of their distributed nature and intertwinement with institutions, markets and technologies." (de Reuver et al., 2018). This significant change improves accessibility and supports eco-friendly behaviors, providing various advantages for environmental sustainability, knowledge sharing, and creative discourse. A few instances of digital platforms that are revolutionizing literature are to be discussed in this research. Hussain et al., in their study on user experience evaluation of the Kindle application, found that almost all the participants were satisfied with services provided by the Amazon Kindle e-book mobile app. On all the four user experience factors examined, namely, perceived ease-of-use, perceived visibility, perceived enjoyability, and perceived efficiency, the evaluation outcome shows that the participants had a good and rich mobile experience with the application. (Hussain et al., 2017)

Amazon Kindle and similar digital platforms have transformed how readers can access literature by distributing e-books and audiobooks globally. It is in line with overcoming geographical obstacles and fostering

inclusiveness. Apple Books promotes eco-conscious activities by decreasing the need for conventional paper and preventing deforestation through digital book sales. Audible, a company focusing on audiobooks, reduces the carbon footprint related to distribution by eliminating the necessity for physical transportation.

Furthermore, Google Play Books supports a variety of literary genres by providing a digital platform for distributing e-books and audiobooks, enabling the incorporation of multimedia features. Kobo, an e-reader and e-book platform, helps preserve literature in digital form, providing lasting accessibility without the deterioration seen in traditional materials. It would also be a supportive application to collect data and preserve information. It is stated in Poloju, KK. et al.'s research article that This toolbox stands out for its advanced features like repetitive questions, and skip logic method and has an advanced mode of questions, including photos, collecting GPS coordinates, audio, and video recordings. This tool could be extremely beneficial in education where there is no cost associated with implementing them. (Poloju, KK. Et al., 2022)

There are various applications for storytelling. One among them is Wattpad, known for its user-generated material and collaborative storytelling, showcasing how digital platforms encourage creative storytelling. Goodreads is another social platform that advocates for environmental themes and increases knowledge of ecological challenges. Scribd is a subscription-based service for e-books promoting eco-friendly practices by supporting a more sustainable way of consuming material. ComiXology, a portal specializing in comics, demonstrates how digital platforms enable the buying and reading digital comic books and graphic novels, thus enriching the variety of literary genres.

Various free domains provide knowledge accessible to everyone. Some of them are Project Gutenberg, which offers complimentary access to timeless literary works in digital format, supporting educational endeavors and advancing literacy, and Librivox, which provides free audiobooks of public domain literature through the efforts of volunteers, with a focus on accessibility and community participation. BookBub helps readers find discounted e-books, promoting the availability of literature through digital platforms.

5. CONCLUSION

As discussed in the above sections, it is evident that producing a paper involves accountable environmental exploitation. Along with other humanmade environmental exploitations, paper production is also a crucial factor that needs much consideration in finding alternate solutions. The digital platforms support environmentally friendly behaviors by minimizing paper usage, waste, and transportation effects. They improve accessibility by overcoming geographical obstacles and making knowledge more widely available. They are preserving literature through their digital archives and are one of the solutions and ideas to tackle environmental issues and offer sustainable alternatives to conventional printing methods. It further enhances educational prospects by providing free access to classic literature, supporting digital learning resources, and promoting literacy through different programs.

The integration of digital platforms in the literary realm extends beyond simple dissemination and utilization. Platforms such as Amazon Kindle, Apple Books, Audible, Google Play Books, Kobo, Wattpad, Goodreads, Scribd, Project Gutenberg, Librivox, BookBub, and ComiXology represent a powerful force that supports eco-friendly practices, improve accessibility, preserve knowledge, encourage innovation, and showcases diverse literary genres. These platforms play a crucial role in creating a sustainable, inclusive, and dynamic literary landscape in the digital age. Their combined influence demonstrates a seamless blend of technology, literature, and environmental awareness, changing the future of storytelling and sharing knowledge. The solution to the problem of the massive amount of paper would be to opt for digital publishing rather than the traditional printing method and sincerely implementing the Print on Demand (POD) method in all circumstances.

CONFLICT OF INTERESTS

None.

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