Development of New Mobile Applications (Industry Specific, Deep Linking)

Matthew Schramm Team 6 – SCHMAT041

1. Introduction

Mobile applications are being used daily by everyone in the world with a recent report showing that in 2017 smartphones had a share of 77% of the global device market and more than 32% of the global population using smartphones. (Weichbroth 2020). Showing the ever-growing market and need for the development of new mobile applications. The development of new mobile applications entails the systematic approach to creating a software application to be used on a smartphone that tackles or solves a problem needed by the user of the smartphone. This can be driven deeper to the development of industry specific mobile applications where the mobile apps are used to deliver a product, solve a need or be part of a business solution for industries such as healthcare, commerce, retail or finance.

Mobile applications are used in almost all industries trying to deliver a product to a consumer. With the emergence of mobile app development completely changing the way users utilize software (Abid Bin Syeed, Suhail Hussain Bhat, and Deepinder Kaur, 2021). Mobile applications are no longer purely used as a communication tool but have evolved into industry-specific solutions for sectors such as retail, commerce and healthcare. With for example mobile applications within the healthcare sector facilitating the everyday life of orthopaedic and trauma surgeons being of great benefit towards the sector (Berger-Groch et al. 2021) . This can be applied in the other sectors mentioned, with mobile applications driving revenue and them changing the commerce space immensely.

Developing new mobile applications is a systematic process that involves many factors such as software design, the evaluation of user experience and the compatibility of the platform. Mobile applications appeared in the digital landscape with the coming together of media, information technology, Internet and advanced technologies (Phongtraychack and Dolgaya 2018). New mobile applications coming into the industry fall into differing categories being native apps, hybrid apps, and web apps each serving a distinct purpose based off the industry and their assigned goals (Phongtraychack and Dolgaya 2018). As mobile applications continue to grow in importance, their ease of use, efficiency, and ability to integrate with other technologies remain key factors in their development (Phongtraychack and Dolgaya 2018). With the app development industry only growing in massive leaps and bounds since its inception (Abid Bin Syeed et al. 2021) there is a need for a deeper analysis of the development of Mobile applications to evaluate and monitor their advances in the various spaces.

1. Evolution of Mobile Applications within industry specific contexts.

With the development of new mobile applications has come the widespread adoption of these mobile applications in the varying industries in the economy such as the finance, healthcare and commerce sectors. These mobile applications have led to greater efficiency, immense automation and the easy accessibility of services. Mobile applications have transitioned from being made for a general audience catering to communication and entertainment into a powerhouse for corporations that play a huge role in their revenue generation such as for example the hospitality industry seeing a massive increase in revenue and customer complaints with the adoption of new technologies such as mobile applications (Car and Stifanich 2020). Mobile applications are now being developed with an industry specific context leading to major advantages in these specific industries as they are specifically catered with unique features catered for that industry.

Many mobile applications are designed to provide general support but they lacked specialization in critical areas such as medical diagnostics, supply chain management and overall industry specific needs (Alanzi 2021). Industry specific applications have shown their need and purpose to tackle the ever-changing and expanding needs of these complex industries. With one of the biggest concerns in a major industry such as finance being the high transaction costs associated with traditional banking over web applications with many major financial corporations relying on outdated infrastructure, resulting in increasing fees and slower process times (Singh et al. n.d.). The use of updated mobile applications within this industry would greatly improve their process times and greatly reduce the fee costs associated with traditional banking. Both general purpose applications and industry specific applications have their advantages and disadvantages within their specific contexts but with the advancement of technologies and the ever-growing needs related to the economic space we are seeing the move from general-purpose applications to the creation of a hybrid general purpose applications and industry-specific application that caters for both general purpose and industry-specific functionalities.

Mobile applications have revolutionized these industries such as within the e-commerce space with the adoption of online shopping through these mobile apps allowing users to shop products from anywhere, they desire. Hybrid mobile commerce applications have emerged to provide both online and offline shopping experiences driving revenue as customers can now shop whenever and wherever (Phongtraychack and Dolgaya 2018). The advancement of technologies used within these mobile applications has also driven greater efficiency and generation of revenue within the e-Commerce space with the development of artificial intelligence and machine learning within these apps playing a key role in optimizing financial applications, improving fraud detection, and allowing the corporations to predict consumer behaviour analytics (Singh et al, 2023.)

2. The development of industry-specific mobile applications.

Mobile app evolution has taken quite a distant leap forward with technology advancements, customer requirements, and industry demands. Initial mobile apps were primarily general-purpose apps such as messaging, navigation, and entertainment. However, with the advancements in artificial intelligence, cloud computing, deep linking, and blockchain, mobile apps have become industry-specific and advanced (Phongtraychack & Dolgaya, 2018). The integration of AI-based analytics, secure financial transactions, and automated capabilities has fueled the need for customized mobile apps that address some industry challenges (Singh et al., 2023). As mobile apps evolve in complexity, developers are faced with challenges of scalability, security, and regulatory compliance, which require the integration of advanced digital solutions to enhance performance, security, and user experience (Alanzi, 2021).

The evolution of mobile apps has been affected by the invention of software development kits, cross-platform tools, and cloud-based services. Initially, the earliest mobile apps were mere utilities such as calling, messaging, and simple games. However, with the introduction of the Android and iOS platforms, developers received better SDKs that enabled them to create more interactive apps (Phongtraychack & Dolgaya, 2018).

One of the most significant developments in mobile application development is shifting from native to hybrid and cloud applications. Hybrid applications allow the developer to code once and release on multiple platforms, reducing costs of development and improving accessibility (Phongtraychack & Dolgaya, 2018). Cloud computing also facilitated mobile applications to store and process data externally, improving efficiency and security (Singh et al., 2023).

Industry-specific applications are created to fulfil specialized business functions, such as telemedicine apps for health, mobile banking apps for finance, and AI-driven recommendation systems for e-commerce (Singh et al., 2023). They enhance automation, optimize operational effectiveness, and assist with industry regulation compliance. As stated, before there is a major shift towards industry-specific applications in effort to seek customised digital solutions to improve their process automation, customer experience and security. As mobile applications become more integrated with AI and blockchain, their role in industry transformation continues to expand (Alanzi, 2021).

3. Unresolved Challenges and Research Gaps in Mobile Application Development

Despite the rapid advancement and adoption of mobile applications within the technological space with its increase in efficiency in many processes, there are significant technical, security and research challenges that remain at large. While all these technological advancements such as AI integration, cross-platform compatibility and cloud computing within the mobile application space have greatly enhanced mobile app usability and performance they now pose technical, security and privacy challenges and risks that are in need of being addressed (Alanzi 2021). For instance the adoption of artificial intelligence within the development of mobile applications rely heavily on extensive data collection raising serious concerns about privacy and security (Madan and Ashok 2023). Many organisations have to follow strict data privacy and protection laws such as the POPI act and the GDPR act creating a major challenge to leverage artificial intelligence capabilities without legal consequences.

With cross-platform compatibility adoption within mobile applications there comes a great challenge of trying to create apps that function seamlessly on the differing platforms being offered on mobile devices such as Android and iOS. Cross-platform limitations are a major concern for developers trying to keep up the performance of their application across multiple systems (Phongtraychack and Dolgaya 2018). This brings upon the need for a standardized framework to be adopted by all developers of mobile applications within the space in effort to integrate better navigation, security and cloud-based support to meet industry-specific needs (Alanzi 2021) and producing the required functionality of the applications while keeping all data secure and their application running at full capacity.

There is a major lack of standardized approaches within the mobile application development space with every sector such as the financial and healthcare both having varying regulations and technical requirements creating a major challenge in terms of mobile application development. The financial sector for example struggles with balancing security, compliance, and user experience emphasizing the need for a more adaptable and standardized framework within the mobile application development space (Singh et al. 2023). The healthcare sector for instance has to follow the HIPAA (Health Insurance Portability and Accountability Act) having a massive effect on how they develop their mobile applications that extremely improve efficiency and their processes. This shows how critical regulatory compliance is within the mobile application space with this act mandating data encryption, secure storage and intense restrictions to patient data (Meskó and Topol 2023). Similarly, the financial sector is governed by the Payment Card Industry Data Security Standard (PCI-DSS) ensuring mobile banking applications protect consumer data through encryption and multi-factor authentication. While both sets of regulations seek to secure user data, HIPAA focuses on confidentiality of patients and PCI-DSS offers transaction security against financial application transactions. Mobile applications continue to embrace AI-enabling capabilities, and regulatory obstacles remain the developers' primary area of focus as they are frequently updated to ensure compliance with shifting security norms (Meskó & Topol, 2023).

Conclusion

The development of new mobile apps has transformed various industries by fostering efficiency, automation, and accessibility in healthcare, finance, and e-commerce. This literature review has explained how mobile apps have evolved from general-purpose tools to industry-specific solutions to meet unique business needs. The integration of AI, cloud computing, deep linking, and blockchain technology has boosted the use cases of mobile apps, providing organizations with customized solutions, better data security, and real-time decision-making (Phongtraychack & Dolgaya, 2018; Singh et al., 2023). Technical complexities, security concerns, and regulatory compliance remain key issues that must be addressed to simplify mobile app development and utilization.

Despite these advances, cross-platform compatibility issues, privacy weaknesses, and the lack of standard development frameworks are some of the biggest concerns for developers. The healthcare and finance sectors, for example, must comply with strict regulatory frameworks such as HIPAA and PCI-DSS, with data encryption, secure storage, and compliance with industry-specific security protocols (Meskó & Topol, 2023). As mobile applications continue to add AI-driven automation and predictive analytics, ethical concerns regarding data privacy, algorithmic bias, and regulatory control must be resolved. Resolving these challenges will be required to ensure continued innovation, improve security measures, and enhance the long-term stability of mobile applications (Alanzi, 2021).

Standard industry-wide protocols should be the focus of future research in the areas of improving cross-platform compatibility, security measures, and AI governance. In addition, more empirical studies on the Return on Investment (ROI) of mobile apps are needed to quantify their financial value and guide businesses in making intelligent technology investments (Singh et al., 2023). As the market for mobile apps continues to expand, developers and enterprises must follow a balanced approach that ensures technological innovation walks hand in hand with security, privacy, and regulatory compliance. Through ongoing research and technological advancements, mobile applications will continue to revolutionize business ecosystems, drive digital transformation, and economic growth in the years ahead.

References

Abid Bin Syeed, Suhail Hussain Bhat, and Deepinder Kaur. 2021. “Study of Mobile App Development Industry.” *International Journal of Scientific Research in Computer Science, Engineering and Information Technology* 154–70. doi: 10.32628/CSEIT217638.

Alanzi, Turki. 2021. “A Review of Mobile Applications Available in the App and Google Play Stores Used During the COVID-19 Outbreak.” *Journal of Multidisciplinary Healthcare* Volume 14:45–57. doi: 10.2147/JMDH.S285014.

Berger-Groch, J., M. Keitsch, A. Reiter, S. Weiss, Kh. Frosch, and M. Priemel. 2021. “The Use of Mobile Applications for the Diagnosis and Treatment of Tumors in Orthopaedic Oncology – a Systematic Review.” *Journal of Medical Systems* 45(11):99. doi: 10.1007/s10916-021-01774-z.

Car, Tomislav, and Ljubica PILEPIĆ Stifanich. 2020. “MOBILE TECHNOLOGY: A TOOL TO INCREASE HOTEL SALES AND REVENUE.”

Madan, Rohit, and Mona Ashok. 2023. “AI Adoption and Diffusion in Public Administration: A Systematic Literature Review and Future Research Agenda.” *Government Information Quarterly* 40(1):101774. doi: 10.1016/j.giq.2022.101774.

Meskó, Bertalan, and Eric J. Topol. 2023. “The Imperative for Regulatory Oversight of Large Language Models (or Generative AI) in Healthcare.” *Npj Digital Medicine* 6(1):120. doi: 10.1038/s41746-023-00873-0.

Phongtraychack, Anachack, and Darya Dolgaya. 2018. “Evolution of Mobile Applications” edited by E. Siemens, A. D. Mehtiyev, V. I. Syryamkin, and A. V. Yurchenko. *MATEC Web of Conferences* 155:01027. doi: 10.1051/matecconf/201815501027.

Singh, Dr Amrinder, Padmakar Shahare, Pratibha Vikram, Dr Vishal Srivastava, and Dr Manpreet Kaur Maan. n.d. “Financial Sector And Blockchain Technology: Challenges And Applications.”

Weichbroth, Paweł. 2020. “Usability of Mobile Applications: A Systematic Literature Study.” *IEEE Access* 8:55563–77. doi: 10.1109/ACCESS.2020.2981892.