

Risks and Requirements in Sustainable App Development

Subjects: **Business**

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Apps are a part of the everyday lives of many people around the world. Digital applications support many areas, including the private sphere and the working world. To strengthen social sustainability in app development, it is necessary to consider users' needs.

app development

users' requirements

sustainability integration

social sustainability

1. Users' Requirements and Risks in App Development

The data collection shows the underrepresentation of the empirical analysis of users' requirements for apps. Only 25 of 1730 articles addressed the requirements of users in their interaction with apps. This illustrates how inadequately the topic is covered in research, considering that the importance of apps has grown significantly in recent years. The first research question can be answered by the generated results as follows: For users, three aggregated requirements are of crucial importance. These are the price–benefit ratio, user-friendliness, and privacy and protection of their data. The requirements for the price utility and the price of an app are summarized under the heading of price. Five requirements are summarized under the heading of ease of use. Privacy and security are interconnected; therefore, these two requirements are combined in one section in the risk map.

Users' requirements and perceived risks include the aspect of safety. The assurance of privacy combined with the protection of user data is a fundamental requirement for users of an app. In contrast, users also perceive security in a subjective way while using apps; this perception is strongest when users think that an app they are using has deficiencies in security.

Within the studies, it was clear that there was no specific questioning around the risks users face when using apps. However, users expressed concerns or perceived risks that could arise when using apps. Six perceivable risks were identified from the users' perspective. These arise when the perceived risks of the users are not sufficiently taken into account by the developers. These risks include incomprehensibility, boringness, uselessness, motivational barriers, uncertainty, and inaccuracy. While these perceivable risks do not negatively impact users, they could contribute to the early deletion of an app. Thus, from the customer's point of view, the perceivable risks also represent a risk for the app developers if they are not sufficiently considered. This would lead to an impairment of economic sustainability in app development. In order to develop a successful app, the requirements mentioned as important by the users must be considered and concerns must be addressed and, if possible, eliminated, especially in the case of security issues.

2. Sustainable App Development Model

It is clear from the literature analysis that sustainability has played a little or no role so far, both among users and app developers. Within the surveys, sustainability was not considered. Thus, there is a clear neglect of all three dimensions of sustainability. Only privacy and protection of personal data played a role for users. This requirement can be assigned to the social dimension of sustainability. With regard to the identification of sustainability in app development, an absolute research gap could be uncovered within the scope of the previous empirical surveys. Typical sustainability criteria were rarely, if at all, included in the survey of users. Yet, many of these criteria that play a crucial role for both users and developers. The previous models are linear in orientation ^{[1][2][3][4]}, and the concept of circularity was not considered. Therefore, the SADM was further developed in light of sustainability and circularity capability. The extended SADM includes the three dimensions of sustainability and shows them along the three value creation stages of app programming, app usage, and end of life/circularity (see **Figure 1**).

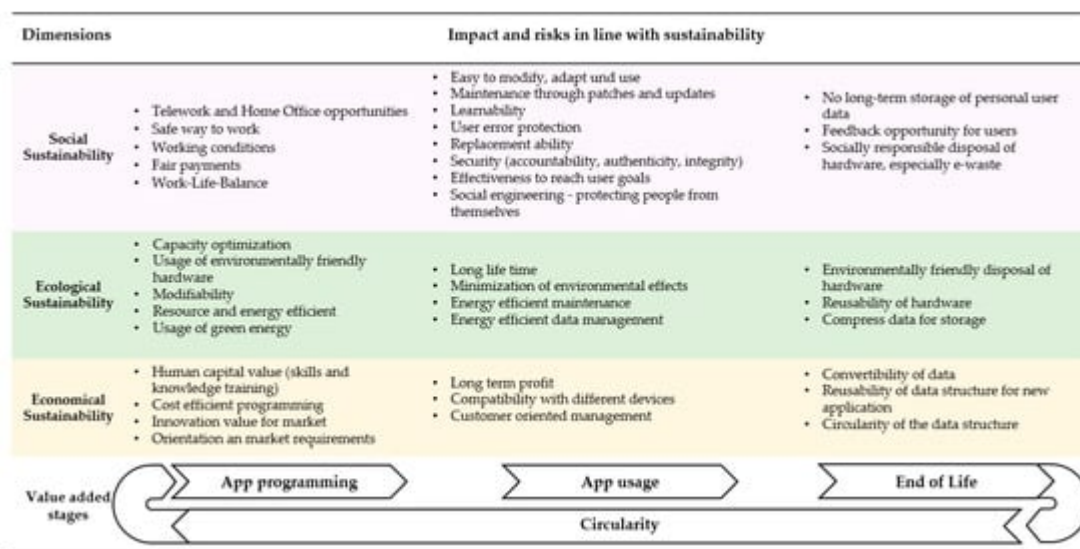


Figure 1. Sustainable App Development Model.

Care was taken to integrate the users' requirements identified. These are particularly evident in the social sustainability category as part of the usage phase in the SADM. In the following sections, researchers show how the criteria of sustainability could be integrated into app development based on the SADM. For future research, it is important to consider various aspects in terms of users' requirements and concerns, as well as the integration of sustainability in app development. The focus of research should be on the risks that arise with the use of apps from the user's perspective. Furthermore, it should be explored why sustainability has not played a prominent role within the users' requirements so far. The SADM should be tested in practice in order to expand it with further criteria. In addition, developers should be consulted about whether the SADM is suitable as a guideline. In order to implement SADM in practice, the respective business models must be taken into account. In particular, smaller development companies such as startups should be in focus ^[5].

3. Conclusions

The continuing expansion of apps in many areas of everyday life calls for the consideration of users' requirements and sustainability. Users' requirements for apps and the integration of sustainability currently play a subordinate role. Not many studies have focused on this topic. Only two articles placed users at the center of their research. This paper extends the previous research by highlighting that users have their own interests when they choose apps. Perceived risks are another factor in the decision-making process when downloading an app. The requirements and the risks need to be considered, especially in order to ensure social and economic sustainability. The app industry, despite its novelty, now generates large revenues and an increased number of employees in different regions.

In addition, the app industry has the potential to develop new business models through an SADM. Practical implications could be introduced in human resource management in particular. This includes the continuous training and further qualification of employees. Sensitivity is necessary to understand users' requirements and to address any perceivable risks at an early stage to ensure the long-term success and social sustainability of an app.

In the future, it will be necessary to analyze the developments in the growing market of apps in order to sufficiently consider the needs of customers and developers. The SADM should be implemented and tested by developers.

Several different aspects limit the generalizability of the results. Students and users with an increased affinity for apps participated in the analyzed studies. Other user groups with less know-how about apps are under-represented, and general conclusions are limited. This is reinforced by the relatively small number of respondents within studies. Furthermore, studies took place in different countries and regions, which means that cultural differences in terms of the respondent's limit generalizability. Data collection is limited to a single date, 14 March 2022; later published studies were not considered. In addition, data collection occurred in two databases for papers published in English. Published studies that are not available in these databases were therefore not considered. The requirements of apps in research question 1 include monetary aspects, ease of use, and security aspects. User risks are motivational barriers, boringness, uncertainty, inaccuracy, uselessness, and incomprehensibility. These risks occur when developers ignore the needs of users. In order to answer research question 2 and to integrate sustainability into app development, the SADM is a suitable approach. In this integration, it is necessary to consider the three dimensions of sustainability along the life cycle of an app. In order to save resources and to ensure an efficient life cycle, a circular approach is necessary. On the developer side, the focus should be on the working conditions of the developers and their training opportunities. On the user side, the requirements of users, as well as their security, should be taken into account. The SADM illustrates the difference from existing linear models in software development.

References

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