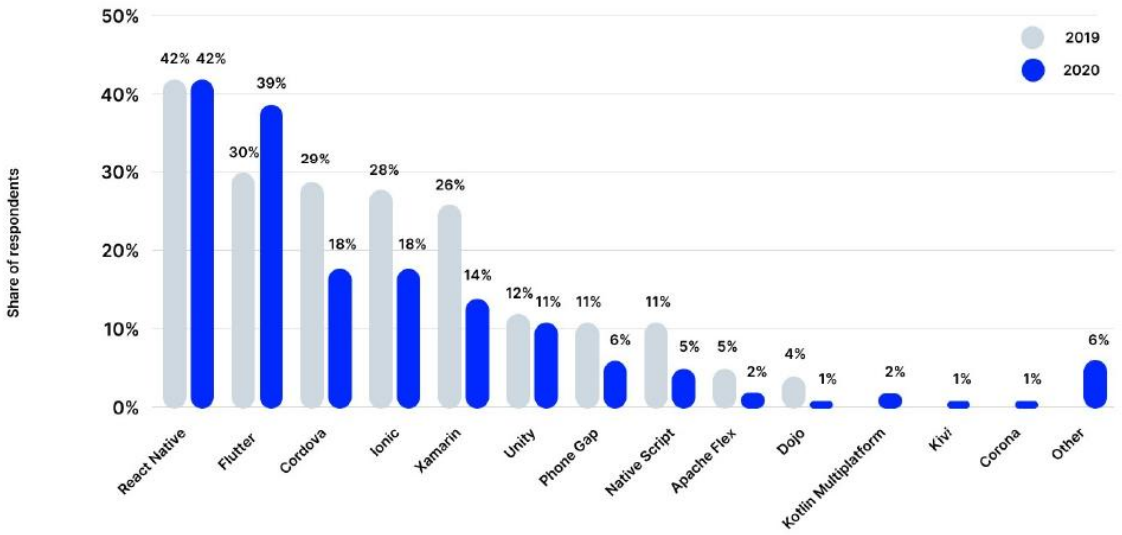

Fig. 4. Top mobile app development frameworks 2019–2021. Source: Statista at https://www.statista.com/statistics/869224/worldwide-software-developer-working-hours.

- PhoneGap is a version of Cordova developed by Adobe. It has been marked as discontinued since October 1st, 2020 with Adobe announcing the end of development for PhoneGap and PhoneGap Build and the end of its investment in Apache Cordova project.
- React Native is an open-source framework created by Facebook to develop native cross-platform apps. UI components of React Native are similar to the native UI views and this offers faster rendering times compared to Cordova which has web-based frameworks. On the other hand, Cordova creates smaller build packages, and it has a better build performance than React Native. Moreover, Cordova makes it easy to bundle an existing web application into a Cordova application and reuse the same code, while in React developers can't simply take the code they used to build a web application and repackage it for mobile.

Applications developed with each of the above-mentioned framework (but Xamarin) are said to be hybrid, meaning that they are neither truly native mobile application (because all layout rendering is done via web views instead of the platform's native UI framework) nor purely web-based (because they are not just web apps, but are packaged as apps for distribution and have access to native device APIs).

Apache Cordova has been chosen among the various possibilities because it provides all the functions needed to develop the prototype target application (access to the device hardware such as accelerometer, gyroscope, camera), whilst maintaining a very low learning-curve (unlike Xamarin, Flutter and React), an active community and documentation (unlike PhoneGap), native Javascript programming and still being among the top mobile app development frameworks in 2019–2021 (Fig. 4).

2.5. Development methodology

System architecture must be defined in advance in order to reduce the complexity, solve architectural problems, reduce development time and costs and provide a proper work management. Unified Modeling Language (UML) is a common visual modelling language, rich in both semantics and syntax, used