THE

INTERNET
OF THINGS

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introduction

The Internet of Things is a well-established computing approach which uses everyday physical objects, electronics, sensors, software, and Internet connectivity to acquire, transfer, store and use meaningful data .IoT projects also use artificial intelligence technologies to automate real-time data analysis and visualization .Many industries (transportation, construction, mining, education, medical, healthcare, and many others) have already made significant strides in transforming their businesses by utilizing IoT technology .Some examples include the use of CCTV,beacon, manufacturing robots, RFID tags, point-of-sale terminals, and remote access control systems (Ding & Jiang, 2018) (Muñoz, et al., 2018). Consumer products, household objects, and personal devices such as entertainment systems, home security systems, lighting, thermostats, wearable devices and smartphones embedded with sensors and network connectivity have also been integrated into IoT projects

LITERATURE REVIEW

Technical challenges of the IoT projects

Currently, creating an IoT project can be extremely expensive. As the practices and technology become more common, the price will go down, but as it stands, an IoT project is a heavy investment. Beyond just the monetary difficulties that IoT projects face, issues like data security, sensor setup and interconnectivity, managing overload, and Artificial Intelligence and Machine Learning application are adding to the complexity in IoT Solution Development. For successful deployment of IoT-based products and services, the top five technologies that are essential are radio frequency identification (RFID), wireless sensor networks (WSN), middleware, cloud computing and IoT application software.

Summary of Key Points

- Techniques like Ignite, IoT Methodology, and variations of Waterfall and Agile are currently used.
- There is a lack of data about which techniques work best for IoT projects.
- There is no clear IoT management framework that can be applied to every project. Right now, we are building project plans on a case-by-case basis.
- Universalizing jargon and management processes for oT projects would be extremely helpful for project development.
- IoT projects are expensive. A net present value option is suggested as a way to justify their cost.

Figure 2 shows response trends to challenges faced by survey takers while developing a project charter on an IoT projects. It is seen that concerns about realistically measuring the IoT 'project's success (or return on Investment (ROI)) and no clear link with overall organizational strategy are always top concerns for such projects. Also, the project statement of work is not clearly defined, concerns about the goals being realistic and attainable and no clear picture of the risks and assumptions related to the project, are usually or sometimes obstacles when working on project charter. Responders also thought that not able to clearly delineate roles and responsibilities can also pose a challenge.
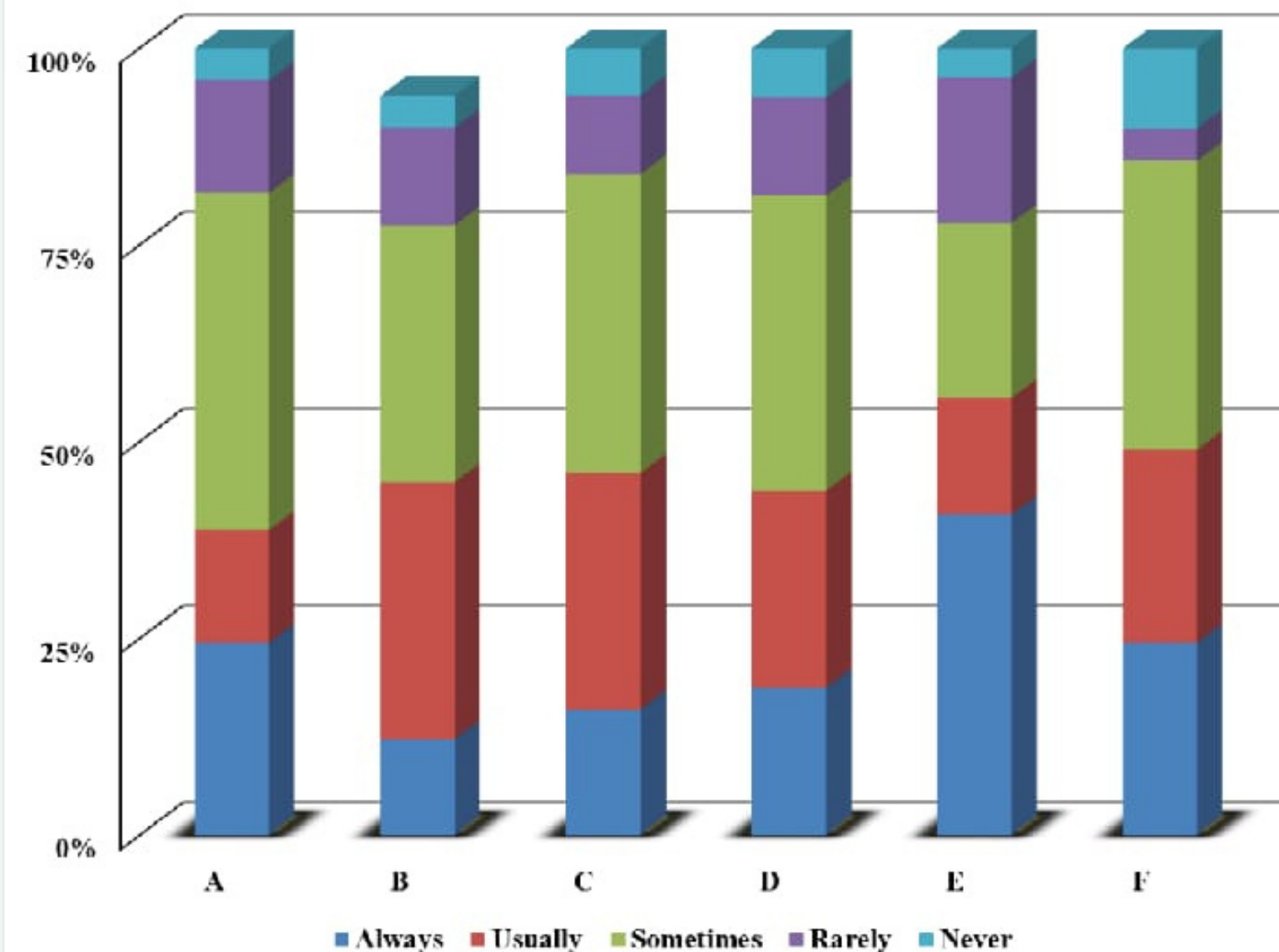
Figure 2: (Color online) Survey response trends for how often professionals in the IoT field face the following challenges: (A) there is no clear link with overall organizational strategy, (B) the project statement of work is not clearly defined, (C) there are concerns about the goals being realistic and attainable, (D) there is no clear picture of the risks and assumptions related to the project, (E) there are concerns about realistically measuring the project success (ROI), and (F) not able to clearly delineate roles and responsibilities.

DISCUSSION

Agile methodology and philosophies that espouse continuous delivery seem to be ideally positioned to address these increasing challenges and difficulties. Agile framework focuses on rapid/time-bound development and a feedback loop where developers can more quickly fix bugs and contribute new code that has been tested and validated. This helps in parallelizing, scaling, and reconfiguring tasks as With the tools and best practices of Agile, embedded engineers and software developers alike will be prepared to effectively contribute to the world of the Internet of Things. This will also satisfy the need to constantly add new features to make end customers happy, and will allow businesses to respond quickly to market needs. It will also help the developers/testers manage their development schedule. The rate of updates for the Internet of Things is increasing rapidly, so organizations should try to navigate the IoT sphere by using Agile development methodologies, or, if they prefer, a hybrid of both Waterfall and Agile methodologies

While defining high-level strategic goals for organizing a business case or project charter for an IoT project, Return on Investment (ROI) analysis is an essential building block, as it helps in establishing baseline expectations for the project scope. The challenge with IoT ROI calculations is that the benefits are very difficult to quantify in the beginning, because companies lack a clear vision, concrete implementation strategy and a solid understanding of how it will eventually produce an ROI. To overcome this the following few steps are recommended:.oT benefits come from data being collected from connected devices and sensors. This data can and should be used to make decisions to improve business processes, reduce costs or increase revenue. Predictive analytic results get better as the quality and amount of data increases, for which either mockup data or lessons learned from similar projects should be extrapolated to better estimate ROI. it's easier to estimate the value of the data being collected if your project begins with a narrow, well- defined focus. This is one reason why experts say narrowing the initial scope of an IoT project is one way to establish a compelling ROI picture. Additionally, starting with an achievable project that has a defined return is a good way to set the stage for a larger, comprehensive IoT plan. Smaller projects not only make it easier to establish ROI, they give you a chance to test your technology, organize your data, establish your miriorities and build a team of stakeholders

CONCLUSION

Agile or a Hybrid of methodology/framework is suitable for IoT projects Defining ROI upfront would help in creating a project charter While building an IoT team, Teamwork skill set can be game changer

A separate research and development phase A proof-of-Concept/Prototype before the actual project begins

Jira and similar project management tools are best suited to IoT projects Among stakeholder, whereas Managers are most engaged, Regulators and End-users need to be actively involved Well defined Risk management, and Project management plan should be followed.

Project managers with interdisciplinary technical knowledge Universally defined business and technical jargon

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