

Cloud ERP – myth or future?

In contrast to a number of other cloud applications, such as customer relationship management (CRM), the adoption of cloud enterprise resource planning (ERP) solutions is low, especially in the multinational manufacturing segment. In this article, we present the findings of a study into the drivers behind adoption of cloud ERP solutions. We provide new insights that will be of interest to anyone currently considering the implementation of a new ERP solution.



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Imagine it's 2025, you are sitting on a terrace in the sun when an email from your team comes in, there is a problem with the salary run this month and they need an approval. You take out your phone and start up your cloud ERP app, log in to the approval, perform a quick check of the amount and submit the approval. Instantly, you remember the stress this would have caused 10 years ago. The next day, you come into work and the sprint team informs you that they have just connected the new algorithm to the cloud ERP system that you acquired two weeks ago. You log in to the profit and loss analysis and, seconds later, the system provides you with a revenue forecast based on an advanced number of internal and external factors. The algorithm provides you with a number of suggestions as to which product categories should be pushed by the sales team, which you then communicate to the sales manager.

This scenario may currently sound mythical, as the implementation and maintenance of a highly customized ERP system requires long implementation cycles and significant effort. At the same time, an increasing number of organizations are implementing out-of-the-box cloud solutions for ever-more complicated systems, such as CRM. Not only has the number of cloud offerings expanded significantly over the last decade, but adoption today appears to be a given for multinationals, whereas five years ago, it was a concept subject to intense skepticism over information security and availability.



The front-runners perceived cloud ERP as the future delivery model for their ERP environments.



However, Rayner¹ showed that the adoption of cloud ERP solutions is still slacking, especially in the large multinational manufacturing segment. In his study, he addressed the reasons behind this and explored how to bridge the gap by giving insight into why large multinational manufacturing organizations cannot, or will not, implement a cloud ERP solution. He also examined the positive drivers of implementing a cloud ERP solution, building on existing research.^{2,3,4}

As with every new technology, there are still many hurdles to overcome. Advantages and disadvantages will always exist; nevertheless, both infrastructure and software technology can now support an all-cloud IT strategy. Rayner's study⁵ shows that 47% of the organizations surveyed said they would move the majority of their core ERP systems to the cloud within five years, although only 2% had already done so. In the same research, 30% of organizations indicated they planned to keep the majority

1. N. Rayner, *Survey Analysis: Adoption of Cloud ERP, 2013 Through 2023*, Gartner, 2014.
2. R. Seethamraju, "Determinants of SaaS ERP Systems Adoption," PACIS 2013 Proceedings, 2013.
3. A. Benlian, T. Hess and P. B. Buxmann, "Drivers of SaaS-Adoption – An Empirical Study of Different Application Types," *Different Application Types Business & Information Systems Engineering*, 1(5), 357-369, 2009.
4. M. Mijač, R. Picek and Z. Stapić, "Cloud ERP System Customization Challenges," *Central European Conference Information and Intelligent Systems*, 132-296, 2013.
5. Ibid.

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of their ERP systems on the premises for the foreseeable future and 17% indicated that they did not have concrete plans for cloud ERP.

This leads to the question: what constitutes a cloud ERP system? R. Seethamraju defines it as follows, "A cloud ERP in this research is defined as a software as a service (SaaS) ERP application, which is delivered to the customer as an out-of-the-box ERP application, delivered from a centralized data center over the internet, providing access and use on a recurring fee basis."⁶

Cloud ERP – pros and cons

Cloud ERP systems that are based on standard workflow, specific business models or the most common way of doing business⁷ provide a number of benefits to an organization. For example:⁸

- ▶ Lower total cost of ownership, as a majority of the resources are provided by a service provider
- ▶ No large upfront spend required
- ▶ Easy-to-use interface that aids quick user adoption
- ▶ Anytime, anywhere access
- ▶ Available applications are very rich in features, with interactive help

6. R. Seethamraju, "Determinants of SaaS ERP Systems Adoption," PACIS 2013 Proceedings, 2013.
 7. M. Mijač, R. Picek and Z. Stapić, "Cloud ERP System Customization Challenges," *Central European Conference Information and Intelligent Systems*, 132-296, 2013.
 8. G. N. Purohit, M. P. Jaiswal and S. Pandey, "Challenges Involved in Implementation of ERP on Demand Solution: Cloud Computing," *International Journal of Computer Science Issues*, vol. 9, 2012.

- ▶ Inherent capability to support a safe computing environment
- ▶ Flexibility to stop or switch business software needs, with minimal associated costs
- ▶ Option to hire the IT resources and avoid the need to purchase servers
- ▶ Easier maintenance, as ERP environments are becoming more complex and challenging to manage

Any out-of-the-box ERP automatically raises the question of to what extent it is able to meet the needs of different organizations, given that every business is unique. Furthermore, Hofmann poses that cloud ERPs can actually weaken the ability of enterprises to innovate because of the difficulties in adapting business processes to the enterprise.⁹

To achieve the full cost benefits, the ERP system should make use of standard business processes without the need for many customizations.¹⁰ With cloud ERP, this effect is magnified, as it can be hosted in a multi-tenancy environment.¹¹ This sharing of infrastructure and application provides a great benefit to customers, as it reduces costs, decreases risks, improves an organization's competitive positioning and automatically results in innovations to the system.¹² Nevertheless, multi-tenancy is difficult if the adaptations to the systems are too extensive; therefore, the urge for customization is best avoided with cloud ERPs. Consequently, it could be derived that configurability is an important characteristic of a cloud ERP model and could be used to determine the cloud

maturity, with only the more mature cloud solutions having configurability options.¹³

What was the study's approach?

The study focused on the drivers of cloud ERP adoption derived from literature, namely:

1. A more configurable ERP is positively associated with cloud ERP adoption.
2. ERP strategic value is negatively associated with cloud ERP adoption.
3. Higher adoption uncertainty is negatively associated with cloud ERP adoption.
4. A positive attitude toward cloud ERP is positively associated with cloud ERP adoption.

These propositions were tested by conducting 11 interviews with relevant subject matter experts who are employed by large multinational manufacturing organizations. All 11 interviewees have specific backgrounds and responsibilities in the ERP environment, such as CIOs, business process owners and functional architects. Only multinational manufacturing organizations were contacted for this research, all of which employ a minimum of 1,000 people and are active in at least 5 countries. One organization did not have manufacturing as its main business activity but was specifically selected for the sample, as it is a first mover in implementing a cloud ERP and, therefore, provided a unique perspective for the study.

The respondents unanimously agreed that, if a cloud ERP were fully configurable, this would be a positive driver to adopting such a system.

9. P. Hofmann, "Cloud Computing: The Limits of Public Clouds for Business Applications," *IEEE Internet Computing*, 14(6), 90-93, 2010.
10. W. Luo and D. Strong, "A Framework for Evaluating ERP Implementation Choices," *IEEE Transactions on Engineering Management*, 51(3), 2004.
11. P. Schubert and F. Adisa, "Cloud Computing for Standard ERP Systems: Reference Framework and Research Agenda," *Fachbereich Informatik*(16), 2011.
12. D. Ziani, "Configuration in ERP SaaS Multi-Tenancy," *International Journal of Computer Science, Engineering and Information Technology (IJCSIEIT)*, 5(2), 2014.
13. R. Seethamraju, "Determinants of SaaS ERP Systems Adoption," PACIS 2013 Proceedings, 2013.

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Key findings of the study

The outcomes showed a clear divide between participating organizations. The front-runners perceived cloud ERP as the future delivery model for their ERP environments, whereas the majority of the organizations were only willing to implement selected point solutions rather than a cloud ERP environment.

With regard to the different propositions, the outcomes were as follows:

1. A more configurable ERP is positively associated with cloud ERP adoption.

The respondents unanimously agreed that, if a cloud ERP were fully configurable, this would be a positive driver to adopting such a system. However, the key to a cloud ERP becoming configurable is dependent on a number of factors related to the organization:

- ▶ The size – the larger the organization, the higher the complexity; therefore, the less likely that a configurable cloud ERP could be achieved.
- ▶ The business the organization is active in – a number of the respondents indicated that the current ERP system is integrated with, for example, production systems. This means that more integrations are needed and, thus, the less easy it would be to create a configurable cloud ERP system.

- ▶ The constituencies the organization is active in – due to certain specific regulations in countries such as Brazil and China, there are additional requirements to the system with regard to tax regulations that are not part of current ERP solutions.

In conclusion, it seems unlikely that a configurable cloud ERP can be achieved in the near future. The question remains: what is the impact of perception versus technical possibility?

2. ERP strategic value is negatively associated with cloud ERP adoption.

There was a clear difference among the organizations interviewed with regard to the strategic value attributed to their ERP systems; this is in line with the literature. For example, one group saw their ERP systems as a non-differentiating system of record. The view of these organizations is that the strategic value does not lie in the ERP, CRM or HR system itself, but in the specific configuration of the systems that serve the business. For example, an organization that runs a standard cloud ERP from one supplier with an integration to a standard cloud CRM system from another supplier could potentially differentiate itself with this setup and outperform its competitors. Organizations that fell into this group did not believe that standardization would make it



easier to integrate systems and drive costs down in the business through “forced” standardization.

The opposing view was presented by another group that believed the ERP system was the pinnacle of the organization. Integration with, for example, production and regulatory systems was mentioned as the reason their systems were unique. These customizations were perceived as strategic to the organization, giving it an edge over its competitors.



The contrast between these groups provides a good indication of where the market is at. The first group was open to implementing a cloud ERP solution, whereas the second group was less likely to fully adopt a standardized cloud ERP solution. At the same time, all organizations were, in some way or form, implementing standardized process models with the aim of standardizing their current ERP environment.

A number of interviewees expressed the view that they would only consider implementing a technology after a number of organizations had already implemented it.

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A number of interviewees indicated that, in their opinion, information security is of a higher standard in a cloud environment than in the current delivery model.



3. Higher adoption uncertainty is negatively associated with cloud ERP adoption.

The third proposition posed that environmental uncertainty from a business and technology perspective, simplified to adoption uncertainty, is negatively associated with cloud ERP adoption. The majority of interviewed organizations confirmed this view. The manufacturing industry, generally, is not a front-runner when it comes to adopting

new IT technologies. Technologies need to be proven before multinational manufacturing organizations will consider implementing them. A number of interviewees expressed the view that they would only consider implementing a technology after a number of organizations had already implemented it and there was a repository of knowledge on the lessons learned and availability of experienced professionals to support the implementation.



4. A positive attitude toward cloud ERP is positively associated with cloud ERP adoption.

The last proposition related to the attitude an organization has toward a cloud ERP system. When attitudes are more positive, companies will be

more inclined to adopt one. A number of respondents indicated that they had been extensively informed by consultants and research companies about cloud ERP. This had given them more insight into the cloud and, for example, how it deals with information security, which had positively

influenced their attitude toward the cloud. However, one of the interviewed organizations indicated that it was very cautious about exchanging information through the internet and was, therefore, not investigating cloud opportunities, including cloud ERP solutions.

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Additional findings from the interviews

Along with the four propositions already identified, two open questions were also posed: one on the perceived drivers and another on the restraints of cloud ERP solutions. The outcomes revealed a number of additional drivers and constraints for multinational manufacturing organizations when considering implementing a cloud ERP environment:

- ▶ General perception and literature on cloud solutions and cloud ERP is that information security is a major concern. However, in contrast, a number of interviewees indicated that, in their opinion, information security is of a higher standard in a cloud environment than in the current delivery model. The organizations that were not lagging in the implementation of cloud services, in general, still perceived a high information security risk for cloud-based applications.
- ▶ The majority of those interviewed indicated that, if a reduction in total cost of ownership of the ERP system could be achieved, this would be a stimulating driver of cloud ERP

adoption. In general, most of the organizations were heavily cost focused, and a number of interviewees also indicated that they would be willing to lose current functionality if that meant a lowering of the total cost of ownership could be achieved.

- ▶ The ability to achieve the required degree of standardization to implement a cloud ERP was the restraint most often mentioned. Front-runners indicated that it was just a matter of time for better configurability to be achieved in cloud ERP environments, whereas the general population were more sceptical as to whether this would be achievable in the future.
- ▶ The last important finding is related to integrations to other systems. The majority of those interviewed had a deep integration between their production environment and their ERPs. These were often heavily customized to facilitate factors such as inputs for standard costing, timely system responses, links to customs and other solutions. It remains an open question whether a cloud ERP environment is able to provide an appropriate solution for these integrations.

Summary of findings in comparison with similar studies

The findings were clear and differed in some important respects from comparative studies in small and medium-sized enterprises (SMEs)¹⁴ and general research into the drivers of cloud (SaaS) adoption.¹⁵ These findings included:

- ▶ The majority of large, multinational manufacturing organizations interviewed will not adopt a cloud ERP solution now or in the near future (i.e., within five years).
- ▶ Even though most organizations are currently working on process standardization initiatives, one of the main restraints to adopting a cloud ERP system is the ability to achieve the required degree of process standardization and the integration of other systems.
- ▶ Front-runners in the implementation of cloud ERP systems believed that, in the future, strategic value from the ERP system will come from the specific combination of standard cloud (SaaS) solutions, rather than the customization

of an on-premise ERP system. The more conservative organizations perceived their current on-premise ERP system as providing strategic value to the organization and were, therefore, less likely to adopt such a solution.

- ▶ Organizational mindset is equally as important as the size and complexity of an organization when implementing a cloud ERP solution.

This study provided new insights into the adoption of cloud ERP. It not only tested the developed propositions on the drivers of importance when implementing cloud ERP solutions in multinational manufacturing organizations, it also expanded the current knowledge about which drivers are of importance and how these differ from those of SMEs considering implementing a cloud ERP.

These findings will be valuable to executives and managers who are currently investigating the implementation of a new ERP solution, as they provide insight and guidance about the decision over which ERP delivery model to adopt. ■

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