# Principles for the design of information systems

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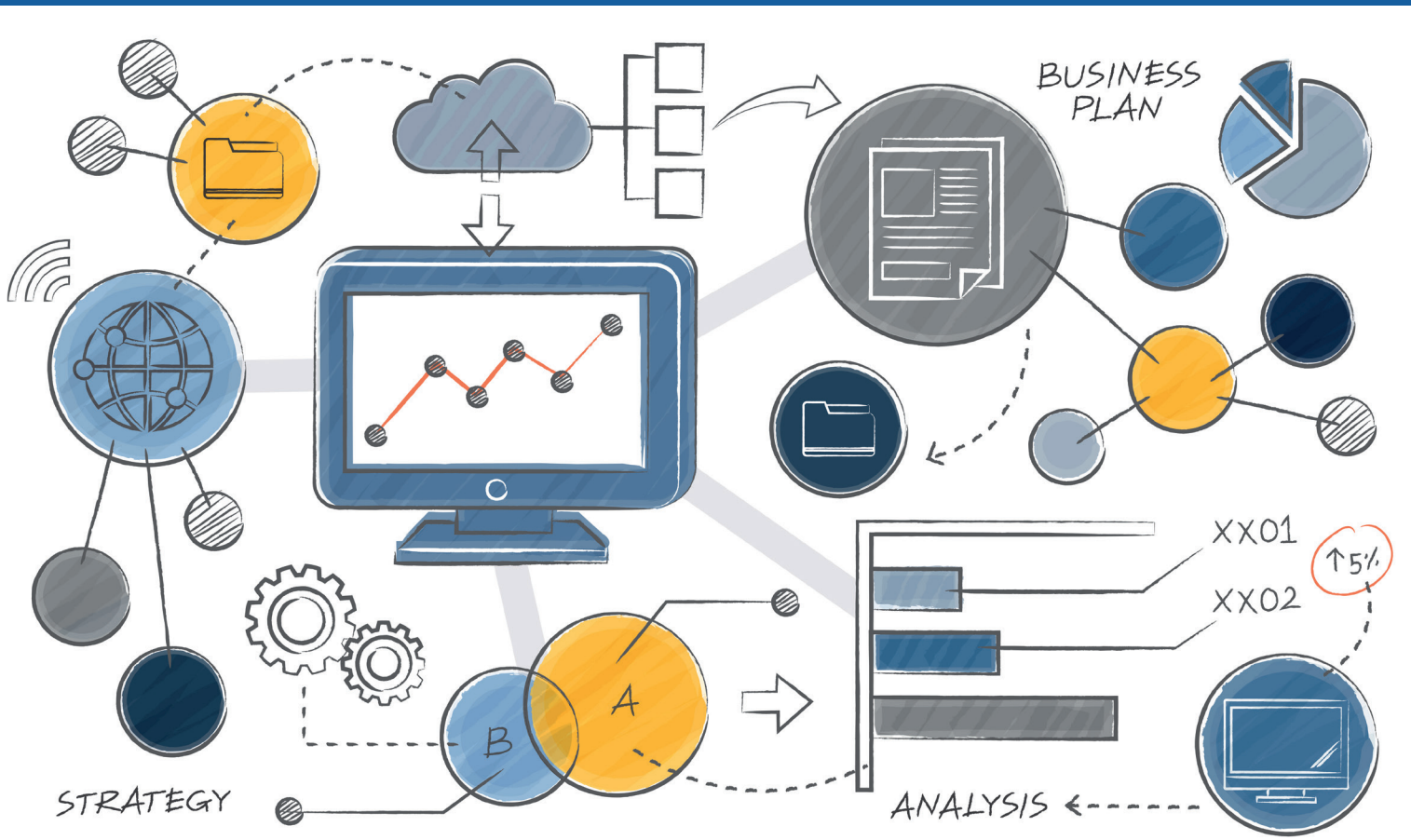


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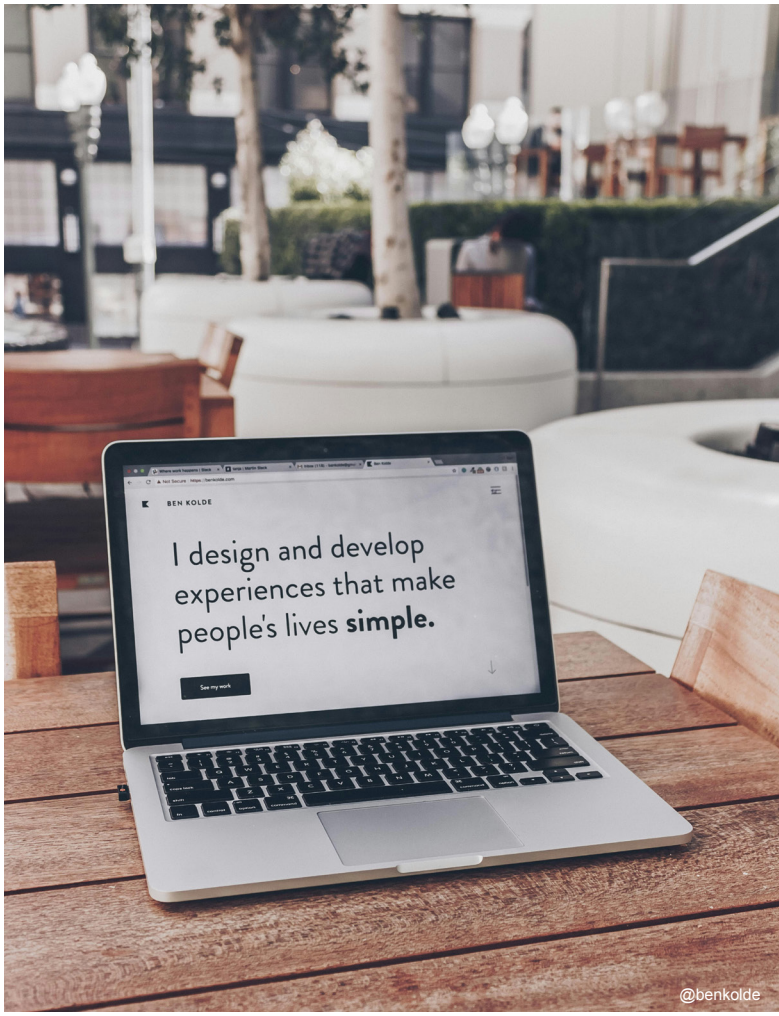
The digital transformation of companies, business models, processes, and information systems is ongoing. Ever-new possibilities for technologies, algorithms, and software ensure continuous further development if it takes place in companies. To facilitate the development of new, hopefully innovative, information systems, the following design principles are derived from theory, concepts, empirical insights, and own experiences. Companies or units within companies can use them to support their design ideas for successful information systems.

## Identify interest & transaction structure

The first step is to identify interests. This covers the interest in what the information system should achieve and the interests of relevant stakeholders. Modeling the transaction structure in which the information system should be embedded helps to understand who is involved and how stakeholders are involved. The transaction structure is a high level process depiction more on the business model level. Typical tools that can be used are first to identify the property rights structure, second the transaction steps to exchange these rights and third the assignment of roles regarding principals and agents.

## Align with the business model(s)

The second step is to clarify the business model. While business models can have various perspectives, the core is understanding which customer needs are addressed with relevant value propositions. This allows to identify the requirements of what an information system has to be able to deliver. Here, individual processes should be made transparent and the offers mapped with relevant features.




## Base design on theories

Third, before starting with any solution, theories should be considered. Theories offer the advantage that they typically describe mechanisms why certain elements lead to certain outcomes based on ample empirical evidence. Considering these elements can overcome typical biases of deciding on intuitive but often not working solutions.

## Embed in enterprise architecture

The fourth step is to consider the existing enterprise architecture. This covers other systems, processes, requirements, databases, etc., that a new solution must either

be compliant with or will lead to changes in the architecture. The existing architecture should be mapped with the idea of a system and a target state should be determined.

## Consider the big technology picture

Fifth, when deciding on specific solutions to address the requirements, current technologies and their (nearby) future development should be considered. There might be new technologies available that allow new features (e.g., augmented reality), platforms will change (e.g., metaverse), or standards will change how users will use the information system (e.g., eye-tracking on the phone).

## Detect cause-and-effects with data

In the sixth step, it is relevant to consider the data that will be integrated and processed in the newly designed information system. A data model with data similar to real data should be set up to understand how data will be created, processed, delivered, and stored for analysis. Using the theories identified, the consequences of using data can be understood better.

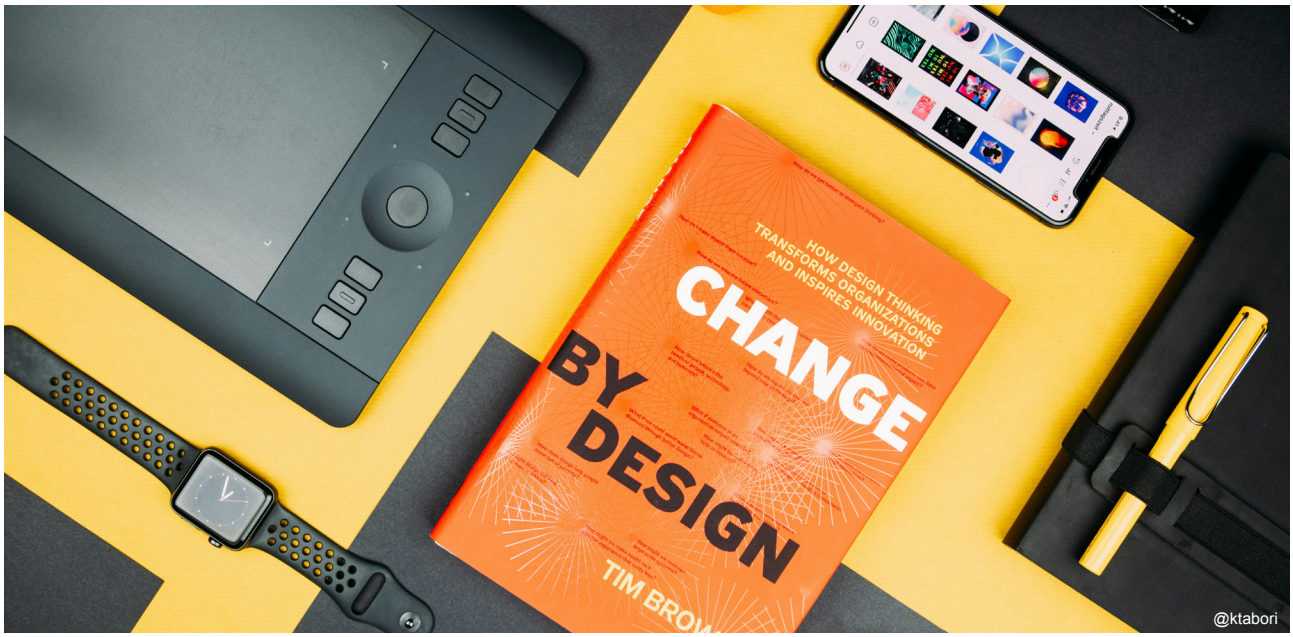
In addition, mock-ups can be used to first test ideas and identify whether the hypotheses for a successful introduction hold.

## Design the face to users from users

Once the backbone of the new information system is addressed, the user interface is another important step that has to be considered. Users do not care what happens in the background, but interacting with an information system should match their thinking and understanding. Thus, find out with experiments how (groups of) users interact best with the system (audio, visual, spatial) and design an intuitive and user-friendly environment.

## Design a rough conceptual IS map

In the eighth step, combine all insights gathered so far and design a rough conceptual IS map. Templates of relevant elements are available for typical systems in organizations, and your insights can fill in the details and individualize them.



## Processes first, then digitization

Coming closer to the design implementation, revisit the existing reality and consider which processes will be supported by the new information system. Then, improve the processes by removing unnecessary waste and standardizing them, and afterward, the world will be a lot easier to implement an information system.

## Think mobile & connected

In the last step, be aware that not only smartphones and -watches make the world more mobile, but also lots of sensors and a good internet bandwidth. Devices can increasingly communicate more with each other and allow for solutions of information systems that are more embedded in users‘ activities. Some prior steps might have to be adapted if this way of thinking has not been included sufficiently so far.

## Some empirical insights on the importance of the principles

A study with 33 participants (business students on a Masters level, who were informed about all principles and should describe two of these principals each) showed that “alignment with the business model(s)” (21 occurrences) and “basing the design on theories” (20 occurrences” are considered as most important. Considering “processes first, then digitization” is ranked third (10 occurrences) followed by “identifying interest & transaction structure” (6 occurrences). The others are considered as less relevant.

## Conclusion

While a specific order of the principles was chosen, they are connected with each other, and changes according to one principle can lead to revisiting the others. Their order can be changed, but it is important to consider all of them to be able to design a potentially successful information system. The first empirical insights have shown that business models, theories, and processes are most important, and thus, this can indicate starting points for the development procedure of new software.

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