Corporate Navigator App – A New-Generation Management Support System

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1 Design Problem

As an umbrella term, *management support systems* (MSS) cover management information systems, decision support systems, executive information systems, and – more recently – knowledge management, and business intelligence (BI) systems for managers [1]. By serving as their central, hands-on, day-to-day source of information, MSS help managers to perform their jobs more productively and efficiently [2].

Their redesign is currently an interesting and relevant subject for two reasons. Firstly, managers have to make decisions faster than they have in the past and want *self-service MSS* to support them in doing so [3, 4]. Secondly, *mobility* is one of the most visible trends in information systems (IS) and companies expect mobile IS to make their workforce – including their managers – more efficient [5]. In parallel, multi-touch, direct-manipulation user interfaces have raised managers' expectations of easy-to-use *smart devices* (hardware perspective) [6] and, thanks to Apple's million-dollar slogan “There's an app for that,” manager awareness of *apps* (small encapsulated software programs) is constantly growing (software perspective) [7].

The objective of this article is to lay out a self-service app for investigating the boundaries of mobile MSS. Taking the Corporate Navigator as an example, a joint MSS developed by a manager focus group from large international companies [8], the prototype on hand complements managers' stationary reporting working routines when they are mobile.

2 Requirements Analysis and Conceptual Design

Corporate Navigator Prototype: Applying a business-to-IT architecture and based on our prior work [9], two characteristics distinguish the Corporate Navigator as a new-generation MSS prototype from its predecessors: It consistently integrates *four*

IS design layers (strategic positioning, conceptual design, business/IT alignment, and IT components) so that it can react flexibly to changing business requirements. In doing so, a *three-step standard reporting* ensures that information is synthesized hierarchically and presented in a condensed format for manager self-service [10]. The *Corporate Portfolio* (A) provides a graphical overview of a company's financial performance with just three KPIs: reward, risk, and relevance. The *Corporate Dashboard* (B) is a one-page report with detailed KPIs structured into five information clusters: financial accounting, management accounting, cash flow and liquidity management, compliance management, and program management. Finally, *Corporate Analyses* (C) cover about ten standard analyses and a flexible periphery for ad-hoc reporting, non-routine information, and links to the transaction systems.

The Corporate Navigator prototype is based on an SAP platform including SAP ERP 6.0 as the enterprise resource planning system, BW 7.3 as the data warehouse, and SEM-BCS 6.34 as the business application.

Objective: The current research project “self-service MSS app” is aimed at aligning the upcoming requirements of managers with “modern” IS capabilities in two respects. The intention is to deliver a *mobile version* of a stationary Corporate Navigator reporting [9] which can be navigated by managers themselves and to complement the MSS content “*beyond the financials*” [11].

Thus, the app design followed the “*mobile first*” paradigm [12] anticipating smaller design elements (most often less than 10”) and alternative input methods such as touch, by introducing new navigation concepts [2]. One example of such a new “mobile first” design is Microsoft's tile design which naturally embraces touch gestures by offering wide-spaced interactive buttons [13].

Project: A two-person BI team and four IS researchers started a five month project in October 2013 with the manager focus group named in Sect. 1. Firstly, they evaluated different *frontend applications* focusing on easy-to-use IS handling, compatibility with the SAP Business Warehouse, and state of the art mobile capabilities [14]. The Corporate Navigator app (see the prototype on hand) is based on the winner of this software evaluation MicroStrategy 9.3.1 [15].

Secondly, regarding the end-user device, the manager focus group voted for *tablets* as its new MSS smart devices. One reason in that discussion was that tablets are expected to exceed portable PCs (notebooks and hybrids) in units shipped in 2013 [16] and, as Apple still dominates the tablet market in terms of hardware sold [17] we set up the Corporate Navigator app as a mobile first MSS design on an iPad.

3 Implementation and Demonstration

Based on the findings of prior research on mobile MSS [18] and complementing feedback during the MSS design from the manager expert focus group in another workshop during the design, a final workshop presenting the results the manager focus group and a first implementation at one of the large international companies [8], implementing the Corporate Navigator app taught us four lessons learned.

Firstly, *microcharts* – a new type of graphics [19] – help to expose important KPIs in a condensed manner (especially when using dashboards). Bullet graphs are an

example within the new types of graphics which show a KPI's actual value in the context of its budget or forecast value. More important, *sparklines* which present time series of important KPIs rather than showing just a single value were well received. In doing so, detailed information on demand should be available as well. A *mouse-over feature* or similar input gestures like tap on a touch-sensitive user interface should be an intuitive way to navigate to these details. This feature enables managers to be aware of the relevant information while being able to obtain further knowledge.

Secondly, *value-driver trees* enable managers to better understand their business by a KPI's decomposition of relevant figures such as EVA (economic value added). Each value driver's (mathematical) inner structure has to be visible and accessible on the app. Combined with *sliders* to vary the most important levers, value-driver trees offer a rich, but easy-to-use way of performing what-if analyses. The results of manipulations are calculated "on the fly" when changing the value drivers and expose information for scenarios such as a most probable, best case or even worst case.

Thirdly, since collaboration is gaining importance in managerial decision-making, our new MSS app supports several forms focusing on commenting [20]. Besides comments within the report or at important KPIs, a *collaboration bar* is a new Corporate Navigator feature. This bar is designed to follow the concept of "show more" and thus is only visible on demand, by sliding it in from the screen side, for example. The bar itself covers comments by managers and their supporting staff in chronological or other orders (time, sender, importance, etc.).

Fourthly, a predefined *exception reporting* process was implemented within the app. Exception reports are being pushed to managers' devices as notification. In a notification, a description is given to choose whether or not to follow the lead by switching to the app. In the app, managers are then able to do instant analyses and reply with edits or comments without leaving the app. Copying and pasting screenshots into an email program becomes superfluous as a result. The "push"-function can be triggered manually by supporting staff, as well as by automatic thresholds. Furthermore, as one of our final lessons learned, an MSS exception reporting should enable managers to subscribe to individual reports or KPIs to receive incremental updates or the reports they subscribed to per se.

4 Evaluate

For *research purposes*, the Corporate Navigator enables researchers to better understand new MSS app design and manager self-service. Thus, it should be a rigorous starting point for future research. The MSS app exposes essential management reporting artifacts such as Corporate Portfolio, Corporate Dashboard, and Corporate Analysis. With its modular design, it integrates not just further reporting elements such as an environmental scanning system, but even improves the non-functional perspective of a "modern" management report design.

For *practice purposes*, the Corporate Navigator app accommodates the changing MSS requirements of new-generation managers, especially when they are mobile. Thus, the Corporate Navigator app should increase the business value of IS by presenting the most relevant KPIs in a manner that is comprehensive in terms of content, but nonetheless brief and intuitive. Using the new MicroStrategy frontend gives the user interface a "look & feel" which covers managers' requirements.

Furthermore, *tablets* accessing MSS can create their own use case in three ways [6]: They can serve as (a) an advanced PDF reader more efficiently than smartphones, (b) they are handier to serve as an electronic typewriter for complex emailing, especially when office documents are attached, and (c) tablets are starting to become managers' preferred device for simple ad-hoc analysis "on the fly."

5 Avenues for Future Research

Since descriptive analytics is often integrated into today's MSS and even models, which predict the future under incorporation of historic data (predictive analytics) become more and more common in BI solutions [21]. We propose *prescriptive analytics* as a next step in MSS design. It originates from operations research and uses mathematical optimization and simulation to suggest optimal behavior [22] or decisions [23]. Thus, a first avenue for future research is to evaluate the benefits of prescriptive analytics incorporated in MSS and its acceptance by managers.

The relevance of *self-service* MSS for managers should be examined as well. Adequate forms of visualizations, tailored to the management's needs, could yield more insights and therefore improve decision-making. Especially reoccurring analyses, e.g. the effects of currency or material price changes, could be done by the managers themselves and pre-calculated by the MSS to keep IS response times short and proactive.

Future research should also examine the benefit of *real-time management* based on new in-memory technology for MSS. Furthermore, a prioritization of managers' most important *MSS use situations* should be interesting for future research and, in doing so, managers exposed their mobile offline situations [6, 14].

Finally mobile MSS should also support "fun and enjoyment." This should be examined more in detail from a manager's perspective.

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