Cockpit Wiring

PROJECT REPORT[a]

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Preamble

Summary

Management 'cockpits' (or 'dashboards') are static or dynamic displays consisting of key performance indicators (KPI) that provide succinct information (e.g. data, performance) intended for decision guidance. While the displayed KPIs are usually well-documented, their relations are typically computational and hidden from view, which obliges managers to form and employ personal (i.e. non-disclosed) mental models of 'how things work'. Interested in a more substantial decision guidance, Kathrein Automotive Portugal in cooperation with Systems Planning℠ seek to view the 'wiring' of the current management cockpit and explore shared dynamic mental models geared towards the understanding of structure and function.

Credits

Kathrein Automotive Portugal articulates with the parent company (Kathrein SE) regarding the composition, measurements, medium, and communication of the management cockpit.

1. Setting

1.1 Object and intent

The examination of the cockpit starts with the representation of the panels and computational relations (§ 2). Causal relations are first sought in the original cockpit (§ 3), subsequently proposed in a new cockpit (§ 3), and finally related to a corresponding operational plan (§ 4). The work is to be considered as a methodological contribution to better practice through better understanding (§ 5).

1.2 Methodology

All project diagrams are created in the Systems Planning℠ modelling language (SPML™): hierarchical breakdown structure (HBS), reverse blueprints (RBS), and descriptive causal diagrams (DCD) — Figure 1.1.

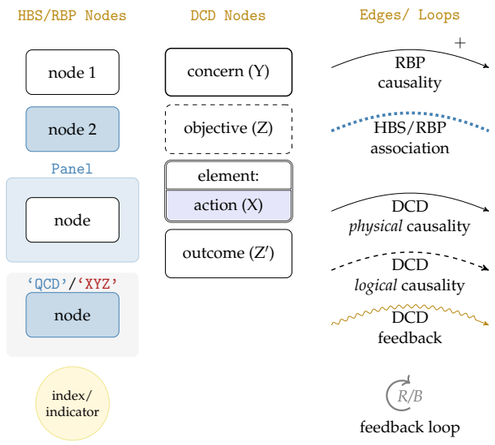

FIGURE 1.1 [KEY] SPML™ notation used in the project

2. The original cockpit (HBS)

2.1 Abstracted view

The original cockpit, abstracted in Figure 2.1, displays no visible relations between its panels. Hence, the onus of drawing dynamic relations is on the viewer — e.g. the operations manager.

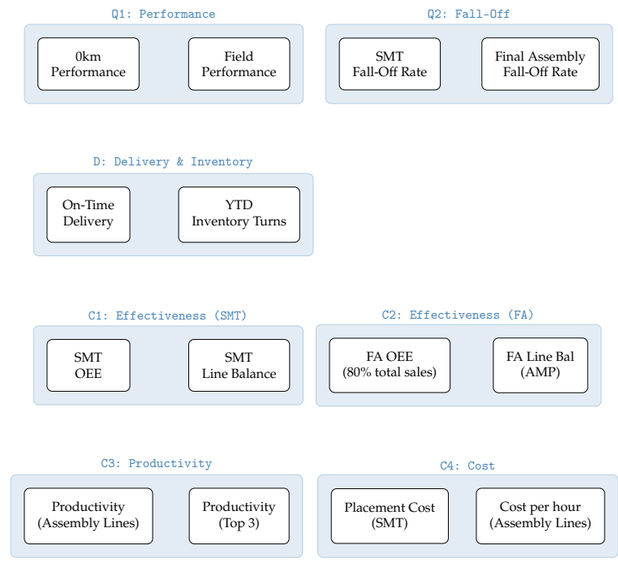

FIGURE 2.1 [HBS] Abstraction of the original cockpit

The information displayed on the cockpit panels is typically in the form of time charts with monthly values for the selected parameters, while attention is given to selected perspectives as deemed necessary — e.g. customers, stations, production lines. Goal marks and trend lines facilitate interpretations and assessments.

2.2 Equations view

A companion to the cockpit presents the computational relations (i.e. mathematical equations) between the cockpit panel elements (e.g. on-time delivery) and measurable indicators (e.g. total deliveries, deliveries on time) — Figure 2.2.

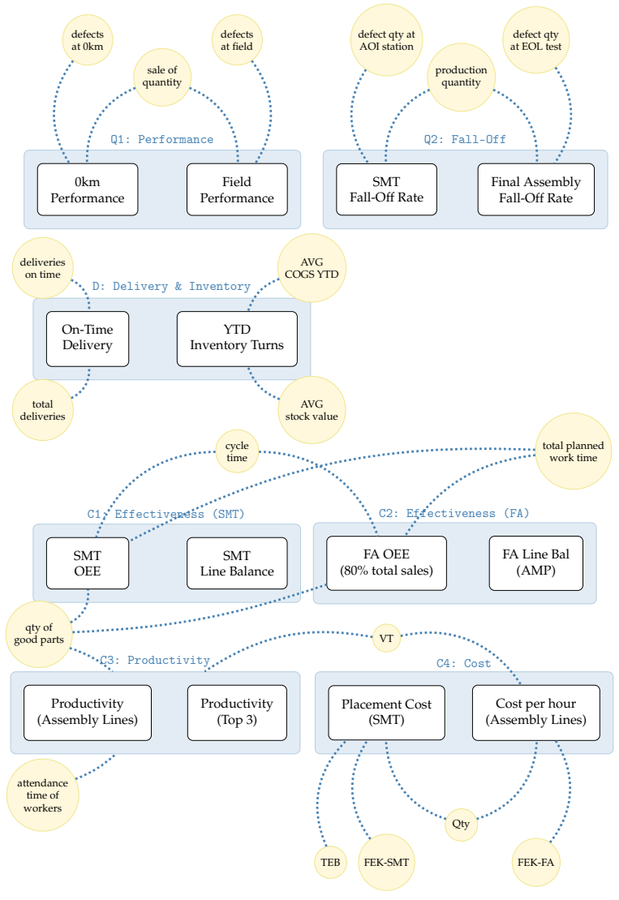

FIGURE 2.2 [HBS] Associations established by the equations

With the relations between indicators and indices made visible (Figure 2.2), the cockpit panels appear to be largely independent.

3. The new cockpit (RBP)

3.1 Adding dynamics

The dynamics of the cockpit can be captured in causal relations between the cockpit panels, according to what they represent (e.g. success, performance), as in Figure 3.1.

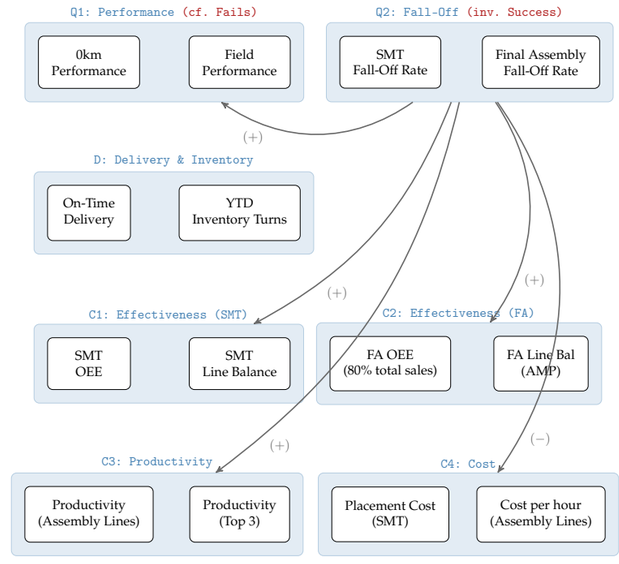

FIGURE 3.1 [RBP] Dynamic view of the original cockpit

The formalisation of causality in the reverse blueprint (RBP) of Figure 3.1 revealed two 'negatives', which are unsuitable for this type of diagrams (Sterman, 2000, p.153): (a) 'performance' was indicated by 'fails', and (b) an entire panel was dedicated to 'fall-off'. It was resolved that 'performance' could remain on the cockpit, and that 'fall-off' should be substituted by 'success'. Hence, causality in Figure 3.1 refers to the corrections and its type (i.e. '+' or '−') is displayed in parentheses as a reminder.

3.2 New RBP with 'QCD' labels

The tentative dynamics of the cockpit captured in Figure 3.1 raise the interest for a full, concise, and coherent systems view of the organisation, which could give rise to a revised cockpit — i.e. a 'better' mental model of the system, such as the one in Figure 3.2, labelled and grouped in the quality, cost, delivery (QCD) organisational view.

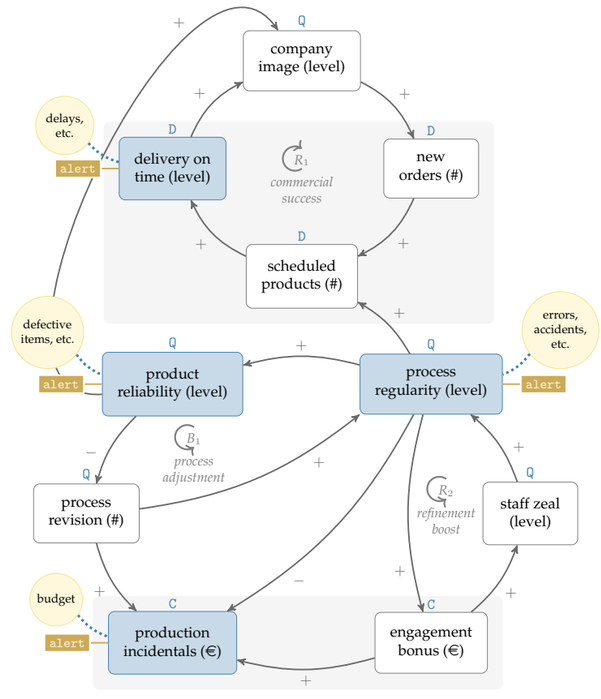

FIGURE 3.2 [RBP] 'QCD' labels and groups

The centrepieces of Figure 3.2 — i.e. the process and the product — are both of the 'Q' type. Holding a key position, the process is adjusted (B_1) and boosted (R_2). In addition, commercial success (R_1) is powered by the company image and the capacity to meet scheduled production.

3.3 New RBP with 'XYZ' labels

The RBP of Figure 3.2 can be re-labelled and grouped according to the 'XYZ' problem definition™ method of Systems Planning℠ — an alternative to PDCA (Perdicoúlis, 2015) — that highlights concerns, objectives, action, and outcomes.

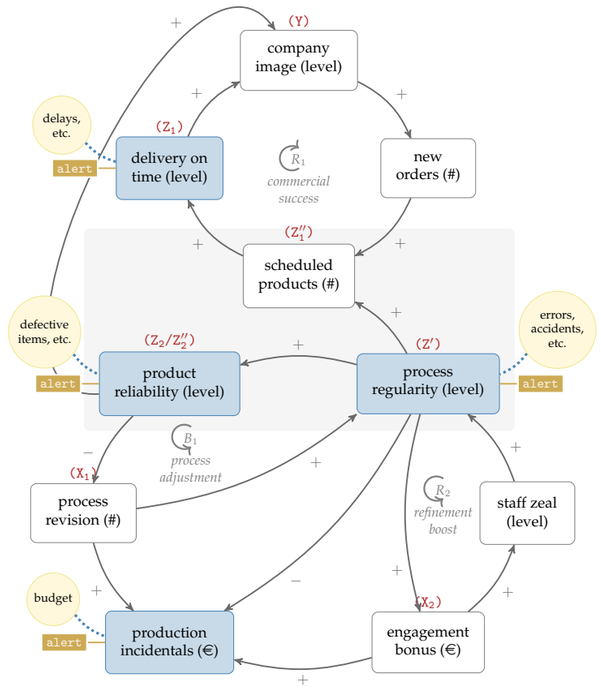

FIGURE 3.3 [RBP] 'XYZ' labels and groups

Figure 3.3 indicates that the high-level concern (Y) sets the two 'pragmatic' objectives (Z_1 and Z_2), and that the custom actions (X_1 and X_2) warrant the regularity of the production process (Z'). The 'XYZ' relations marked in the descriptive causal diagram (DCD) of Figure 3.3 are also to be found in the operational plan — Figure 4.1.

4. The operational plan (DCD)

Figure 4.1 is a complementary perspective to the 'XYZ' causal map (Figure 3.3), revealing the reasoning of the operational plan. The two perspectives should articulate and double-check on each other, ensuring consistency 'across the board'.

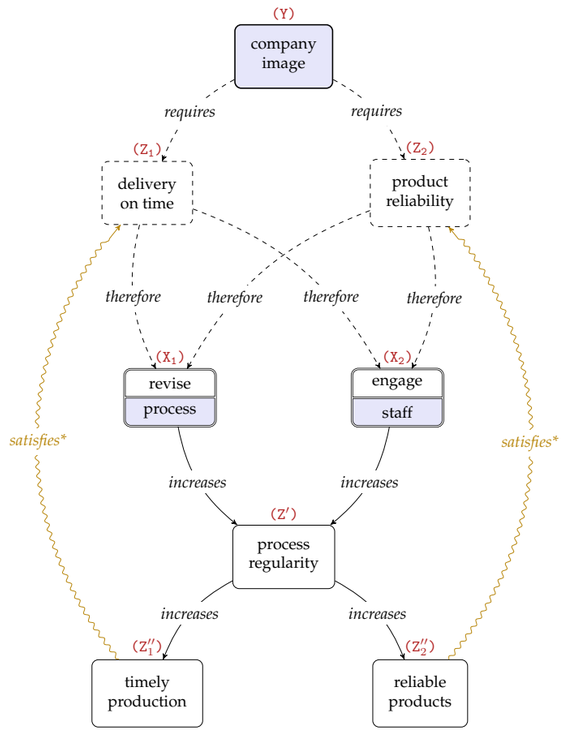

FIGURE 4.1 [DCD] Operational plan

Exposing an argument in a planning perspective, Figure 4.1 states that the company image is based on timely delivery (Z_1) and product reliability (Z_2), which are thought to require process revisions (X_1) and staff engagement (X_2); also, the resulting process regularity (Z') warrants a timely production (Z_1'') and product reliability (Z_2''), which respectively satisfy the original objectives (Z_1 and Z_2).

5. Discussion

5.1 Application

Three cockpit candidates (Table 5.1) employ different mental models — from implicit to explicit — to assist the operations manager in monitoring key system parameters, making interpretations, and preparing appropriate actions.

DIAGRAM	CONTENT	USE
Figure 2.1	parameters/ KPI	monitoring
Figure 3.3	dynamic system	understanding, monitoring
Figure 4.1	dynamic plan	understanding, governance

TABLE 5.1 Cockpit candidates

A complete management cockpit can be composed with two complementary views: the organisation as a system (RBP, Figure 3.3) and its operational plan (DCD, Figure 4.1). The two views may appear in parallel, offering concurrent perspectives for more comprehensive understanding and interpretations. Familiarity with the system and the operational plan — and thus deeper understanding — comes from the respective 'manual simulations' (i.e. tracing the pathways), as well as from the 'bridging' exercise that checks for coherence between the system and the plan.

If there should be only a single dynamic cockpit version, then the RBP (Figure 3.3) is the prime candidate because it is more relevant for monitoring purposes (Table 5.1); it also comes close to the original cockpit (Figures 2.1 and 3.1). The inputs and calculations of the RBP elements are expected to follow the same arrangements of the current cockpit.

Cockpit revisions — including the first adjustment for application — are at the discretion of the management, provided that any concurrent versions of the system (RBP) and the plan (DCD) are kept in coordination. Long-term application of the new cockpit, either with a single or concurrent perspectives, should provide valuable feedback about the innovation of considering 'how things work' during operations management and/ or planning.

5.2 Context

The original management cockpit (Figure 2.1) fits in with the mainstream practice (Perdicoúlis and Glasson, 2011). Encouraging something this 'normal' to provide understanding about 'how things work' is indeed driven by inquisitiveness, but may appear excessive to those who merely seek a 'quick view' of the organisation's affairs, similar to an aircraft cockpit or an automobile dashboard. While pilots and drivers are not expected to be engineers, they need to know what could be happening 'under the hood' for any indication of the instruments. The same applies to organisation managers.

The understanding stimulated by the RBP and DCD diagrams contrast to the 'point-thinking' encountered in the indicator-based culture (Perdicoúlis and Glasson, 2011), epitomised by utilities of the management and planning world such as the SWOT analysis. While SWOT is applied in a 'point-thinking' mode, it does require a preparation of visualisation and understanding as demonstrated by the 'graphical SWOT' (Perdicoúlis, 2018).

The 'XYZ' problem definition™ (XPD) method used in the DCD or plan view of the cockpit (Figure 4.1) is an alternative to the classic 'Plan-Do-Check-Act' (PDCA) method, also known as the Deming/Shewhart cycle (ISO, 2008). Despite the ubiquity of PDCA, XPD is preferred for providing better resolution in the assessment or 'check' phase and substantiated pathways to the improvement or 'act' phase (Perdicoúlis, 2015).

6. Conclusion

Kathrein's current KPI-based management cockpit allows for personal interpretations of 'how things work', which can be supported by computational and causal views — Figures 2.2 and 3.1 respectively.

A new dynamics-based management cockpit, with alternative 'QCD' and 'XYZ' labels and groups (Figures 3.2 and 3.3), aims for disclosed and shared reasoning in a way that facilitates understanding regarding structure and function, and whose argument is double-checked in the complementary governance perspective with the organisation's operational plan (Figure 4.1).

The dynamic cockpit (Figure 3.3) and accompanying plan (Figure 4.1) may be implemented in their current configuration, or after suitable adaptation — e.g. introducing new parameters and corresponding relations. Feedback from the project's application will be of value for both the management and governance practice of Kathrein, as well as for the methodological advancement of Systems Planning℠.

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