

Resource Integration Advantage Across the Hierarchy: Bridging the Gap Between Theory and Practice in Multi-Level Asset Orchestration.

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Abstract

This paper illustrates how a well-structured use of 'Asset Orchestration' can facilitate business change within a specific Enterprise. The study thus demonstrates how systematic integration and facilitation of collective decision making at different levels of abstraction can support large-scale organisational change within multi-level

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management teams. The approach taken provides a Reference Model, or road map for multilevel decision making. This road map was conceived to: (1) Help visualise and improve understandings about the application of asset orchestration approach; and (2) Provide a framework for organising (and sustaining) interdisciplinary transformational projects. (3) Provide a 'source of reference', with an embedded capability to guide decisions made and/or actions taken by different classes of user concerned with the life cycle engineering of a business.

Keywords: Resource- Based View, Dynamic Managerial Capabilities, Asset Orchestration and System Dynamics Model.

Introduction

Resource orchestration AO concept remains a highly active area of research. Yet, [Sirmon et al. \(2011\)](#) argued that previous research on resource orchestration has not paid enough attention to the role of managers at different levels of a firm's hierarchy. For example, [Helfat et al. \(2009\)](#) did not specify the managerial levels to which their theoretical research applied. As a result, the relationship between asset orchestration functions and the different levels within firms has only been studied to a limited extent, indicating a need for further research ([Sirmon et al., 2011](#)).

From other side, the Strategy as Practice perspective, as emphasized by [Hendry et al. \(2010\)](#) and [Whittington \(1996\)](#), focuses on managerial actions, specifically "how to be an effective strategy practitioner." This perspective enhances the understanding of mechanisms that firms can use to adapt to change, particularly through the lens of dynamic capabilities theory, which serves as a driver of practice-based organizational change ([Wenzel et al., 2021](#)).

This paper argues the present literature about AO is largely theoretically based and as a consequent there has remained a lack of sufficient practical application detail about the methods and mechanisms that can be deployed by managers made responsible for achieving asset orchestration within real case organisations. With a view to addressing this lack of practical application detail, this research study links 'notions about AO mechanisms' to 'practical cases of change strategy in organisations. The present study has observed two significant gaps within the emerging AO literature, as follows.

Gap 1: lack of real case AO examples, from which other can learn and deploy similarly. Current literature suffers from a lack of detail concerning relations between resource orchestration mechanisms and different organizational levels of firms, such as those suggested by [McGee \(2005\)](#) and [Sirmon et al. \(2011\)](#) that have not yet exemplified and examined. Without descriptions of how emergent AO theories can be practically applied businesses at large will remain reluctant to adopt those theories. One such difficulty here is that very significant differences in AO processing will be necessary across the full range of businesses that exist globally; such that they each can respond

uniquely and competitively within their own specific business environment. But the present study believes, as explained in later sections of this paper, that practical guides to structuring key aspects of AO can be developed in the form of reference models.

Gap 2: is about lack of consideration/concern for the need to integrate/structure the interworking of managers with their different competencies and domains of concern; and whom may be otherwise organised hierarchically or alternatively via some other management structure. Typically, a prior research on AO has not agreed yet any organizational levels at which the study can be systemically applied (Sirmon et al., 2011). Whereas the present study believes that practical guides in the form of reference models of AO can lend organising structures to various forms of AO project and thereby can offer organisational guides that integrate the various and many managerial decisions typically required during specific cases of AO processing.

Therefore, there is a need for increased focus on the integrated management processes across the structural levels of firms. Accordingly, the current paper offers a practical strategy to apply the reference model in a real case of large scale transformational change.

Literature review

Resource- Based View (RBV), the dominant strategic management framework, suggests that a firm's competitive advantage and success is determined by its unique resources and capabilities, rather than external factors such as market conditions or industry structure. (Barney, 1991; Barney, 1986; Eisenhardt & Martin, 2000; Penrose & Piteleš, 2011; Wernerfelt, 1984). Barney (1991) (Maan and Al-sabaawe, 2018). also states that valuable, rare, inimitable, and non-substitutable (VRIO) resources is a key to competitive advantage of firms. Further, Barney (1991), argued that these strategic assets provide a basis for sustained competitive advantage of firms.

However, RBV faces criticism for not fully explaining competition and maintaining advantage in ever-changing markets (Eisenhardt & Martin, 2000). Later, scholars argued that *"merely possessing such resources does not guarantee the development of competitive advantages"* (Al Halbusi et al., 2019). Subsequent scholars have extended the resource-based theory to include the effects of dynamic business markets, thereby pointing to the need for a dynamic view of a firm's resources (Bharadwaj, 2000).

The concept of Dynamic Capabilities, pioneered by Teece et al. (1997), encapsulates "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997). This perspective offers a significant response to the crucial inquiry of how can firms successfully survive and thrive within changing business environments. However, despite being an active area of research, the dynamic capabilities concept suffers from a lack of a clear intellectual foundation. Studies indicate significant issues regarding

the effects and consequences of dynamic capabilities ([Laaksonen & Peltoniemi, 2018](#)).

[Adner and Helfat \(2003\)](#) posit that the theoretical focus has shifted toward the role of managers in "*building, integrating, and reconfiguring organizational resources and capabilities*" (P: 1012). Consequently, several subsequent scholars have considered the concept of Dynamic Managerial Capabilities (DMC) akin to providing dynamic organizational capabilities ([Manssor et al., 2021](#),; [Ahmed et al., 2018](#)). Additionally, [Hansen et al. \(2004\)](#) conclude that "*what a firm does with its resources is at least as important as which resources it possesses*" (2004 P: 1280), thereby underscoring the pivotal role of management in configuring and continuously deploying a firm's resources and capabilities effectively

Recent scholarly extensions of Dynamic Managerial Capabilities explicitly address the notions of asset orchestration ([Helfat et al., 2009](#)). It is argued that a critical function of DMC is asset orchestration, which involves "*the effective use of key resources of firms in a dynamic setting*" ([Helfat et al., 2009](#).) This perspective presents an opportunity to achieve long-term competitive advantage, suggesting that a firm's strategy should include selecting and coordinating new resources and redesigning its business model through configuring and orchestrating valuable and inimitable resources and capabilities ([Mansoor, et al \(2021\)](#)). Scholars emphasize the pivotal role of managers in these resource-orchestrating processes. For example, [Holcomb et al. \(2009\)](#) assert that a firm with resource orchestration that is well-integrated "between departments" achieves high synchronization, making it difficult for rivals to replicate these strategies.

Methodology

Qualitative data used to generate CLD:

The coding method clarified in this research study was influenced by case study building theory pioneered of [Eisenhardt \(1989\)](#), a rigorous, yet flexible way to build a theory from fresh data (e.g., in our case answers obtained during semi-structured interviews). In particular, the inductive nature of case study model is aligned well with the conceptualization phase in the processes of causal loops generation ([Kopainsky & Luna-Reyes, 2008](#)). According to [Kim and Andersen \(2012\)](#) qualitative data could be used to;

1. Support the processes of generating reference modes.
2. Elicit the basic causal links underlying the model structure.
3. Confirm or modify existing model structure.

The coding method presented in this study is inspired by the coding practice developed by ([Kim & Andersen, 2012](#)). The study motivated to use a well-structured text-coding method to systematically elicit causal structures from qualitative data to

generate causal loop diagrams. These kinds of diagrams will have use later to craft and validate causal loops diagrams that describe phenomena associated with AO.

AO Reference Model

With the aim of bridging gaps in general understandings about how emergent AO theory can be practically applied, [Mansoor et al. \(2021\)](#), proposed and began to test practical uses of their proposed 'AO reference model'. [Figure 1](#) visually depicts their first 'AO Reference Model': which was originally designed to provide a simple representation of AO concepts and thereby to outline how distinctive managerial actions may be perceived and organised in support of AO projects. Subsequently this study began to practically deploy this 'AO Reference Model' as an interviewing tool with which to survey managers currently engaged in AO processing within firms. Thereby the reference model provided a framework via which to contrast and compare actual characteristic features of different AO projects that interviewees had participated in, and how significant operational change had resulted within their host enterprise.

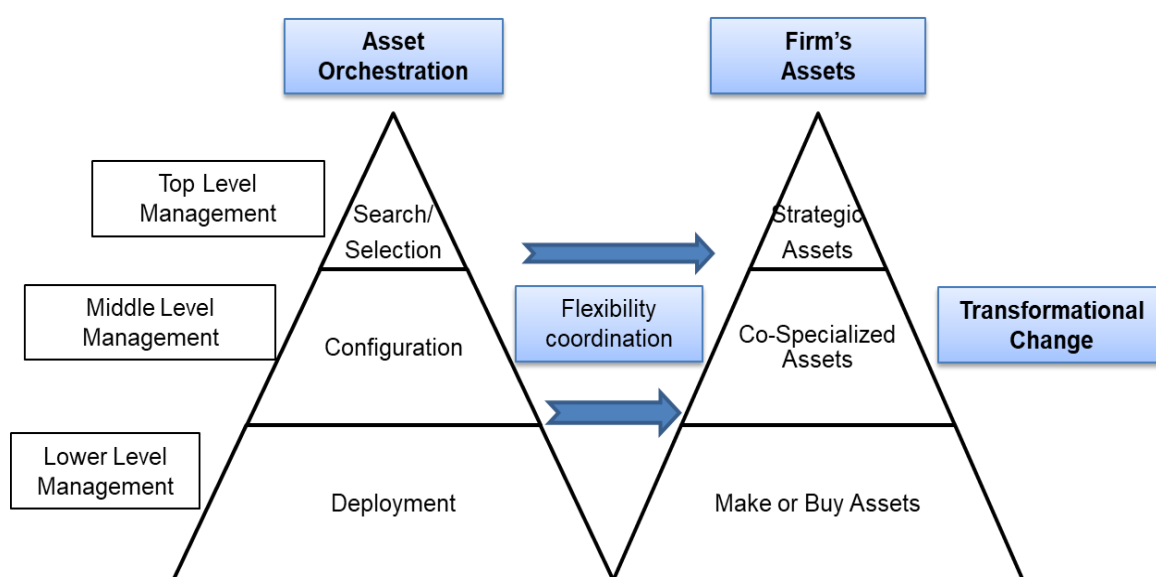


Figure 1: AO Study Reference Model adapted from "[Mansoor, et al \(2021\)](#)".

One such prime example of AO case study work was conducted by using 'AO reference model' to structure the interviewing of the many and various managers working for a world class semiconductor manufacturing firm. Here those organisationally related managers were interviewed with respect to their specific and relative AO roles; as they collectively functioned to achieve the global manufacture of a new semi-conductor product. Similar practical characterisations of AO case studies were made by the present authors when interviewing management teams involved in a number of other AO projects, each with their distinctly different businesses goals.

In the next section we will illustrate how system dynamic modelling can be usefully linked to the study reference model via a proposed road map for AO applications.

Need for a New Road Map for AO Projects

The forgoing explained: That prior to the new research described in this paper, the present authors had reviewed emergent AO literature and had proposed and practically applied a 'reference model of AO processing' ([Mansoor et al., 2021](#)). The purpose when so doing was to use this reference model to guide interviewing of managers in order to document procedural aspects of actual change projects carried out in firms of different types and sizes, and that compete in distinctive markets.

That during case study research ([Al-Sabaawe et al., 2020](#)) we found that the use of this AO reference model resulted in documented examples of latest AO thinking in action.

Also we considered further our study of a world leading firm producing semi-conductors which was referred to previously. We will refer here to this firm as GMS (i.e. a Global Manufacturer of Semi-conductors).

Consequent upon our interviewing GMS managers, agreement was made that Search and Selection, Configuration, and Co-ordination processes that GMS managers and engineers had realised to:

Create a distributed manufacturing capability for the firms' new semi-conductor product. Indeed during previous business change consultancy experiences of the present authors (gained during a significant number of previous incremental, developmental and transformational change projects for various clients operating in industrial, local government and educational sectors) our research team had found a lack of project planning and formality when seeking to decompose, then subsequently re-integrate decision making and action taking amongst multiple change project actors ([Battilana et al., 2009](#); [Holm, 1995](#); [Martin, 2011](#); [Seo & Creed, 2002](#)).

Bearing in mind these experiences and observations the present authors considered alternative means by which collective (multi-stakeholder, multi-level, multi-disciplinary) AO decision making might better be enabled within large and medium sized firms that are required to design and implement large and medium scale change projects. This led the present authors to conceive (with reference to both the GMS change case and other industrial, government and educational change cases they have supported) a 'holistic AO-based decision making approach informed via use of an AO Road Map interconnecting a developed and collective use of coherent sets of simple cognitive models.

Consequently, our research team proposed that during distinctive phases of the road map a set of simple, semi generic and visual representations are collectively developed by the responsible management teams to unify and encode their various and collective understandings and perspectives such that they better communicate and document their collective AO thinking; leading towards:

1. Agreement upon the 'integrated design' of a suitable set of AO processes and asset transformations, as part of critical project threads (and their decomposition into sub-projects) taken (primarily by sub-project teams) towards the overall design and realisation of any significant enterprise change for which common and corresponding information and workflows need to be defined.
2. Improved change project planning, documentation and potential reuse of knowledge and information during the lifetime of a firm; and thereby through the life-time of its upcoming products and systems. An outline description of such a holistic approach is next explored

Results

To proposed road map of cognitive modelling in support of holistic and re-useable AO

We therefore propose the use of a step wise method of using a coherent set (or 'collage') of simple cognitive models; thereby providing an embedded infrastructural capability which underpins the stepwise application of emergent AO theories, ideally such that in the future many organisations may use this approach to gain in utility when they specify, resource and justify large and medium scale change projects and related project outcomes.

Our recommended methodology therefore seeks to facilitate and integrate collective/team-based decision making, and subsequent action taking, via what we consider to be a semi-generic road map of collective development and deployment of model driven thinking.

By defining this road map our strategic aim is to seek better 'integration', 'rationale development', 'explanation', 'documentation', 'dynamic (time based) analysis' and 'reuse' of (multi-stakeholder, multi-level, multidisciplinary) thinking, decisions, actions and related knowledge and information interchange.

Outline description of a proposed road map in support of holistic and re-useable AO

Here we describe interconnect threads of decision making which we believe will underpin typical project phases of a proposed new approach to AO.

Multi person, team based thinking during each phase of this approach should be supported by one or more fairly simple and shared cognitive models; where typically those models will be generated and then fleshed out to underpin collective cognition within a programme (and/or programmes) of team meetings, thereby encoding, sharing and recording coherent concerns and understandings. Typically, those concerns will cover multiple partners, multiple stakeholders, multi-level of abstraction and multi-disciplinary concerns and views. The cognitive models so

produced should themselves (both individually and collectively) be well structured in order to help conceive, facilitate, and plan change and also to help document meeting agreements. The road map of cognitive models should also function to flesh out the rationale for overall collection of the decisions made.

Given the potentially different natures of possible change projects, their sub-projects and the competences of associated team members.

In this paper we illustrate a stepwise use of a few cognitive models which were found to suitably support the application of emerging AO concepts in the case of transformational change in GMS. Critically we recommend however that any collage of cognitive model selected, developed and used should themselves deploy coherent concepts, which can be understood readily by all relevant background disciplines of those various team members involved.

It is assumed that a number of significant preparatory actions will have been taken before any particular large scale AO project is launched. For example, in the GMS case of transformational change, prior to initiating the transformational change project

1. GMS divisional R&D teams had specified the need for a new product structure and its elemental de-composition, as well as specifying and testing a selection of critical manufacturing operations and processes;
2. Many GMS managers had previous experience of involvement in change projects, of various scale, scope and focus. Hence they would bring to bear their own project knowledge and understandings, including those relevant to GMS organisational and cultural issues and constraints, in addition to their personal specialist knowledge and skills;
3. The GMS marketing division had already been actively consulted by the GMS product design division as to potential scenarios of growth for the new product design; and

Change Project Phase One:

Agree in outline potential candidate scenarios of change.

During this first project phase we recommend that all relevant strategic/board members and their key advisors should, as part of a high level management team, agree upon one or more possible candidate scenarios of change (i.e. an outline of possible changes over time to the firm and its new product(s)). Those candidate change scenarios may typically originate from within marketing, R&D, planning, process engineering and/or product engineering divisions of the firm or possibly from potential business partners or investors.

To support phase one various cognitive models (such as product models, process models, organograms, demand and/or supply profiles), could be used to facilitate

collective thinking leading to a collective choice (by the team as a whole) of scenarios of change that require further scrutiny. Figure 2 shows roles played by the Phase 1 project team deployed by our case study company GMS.

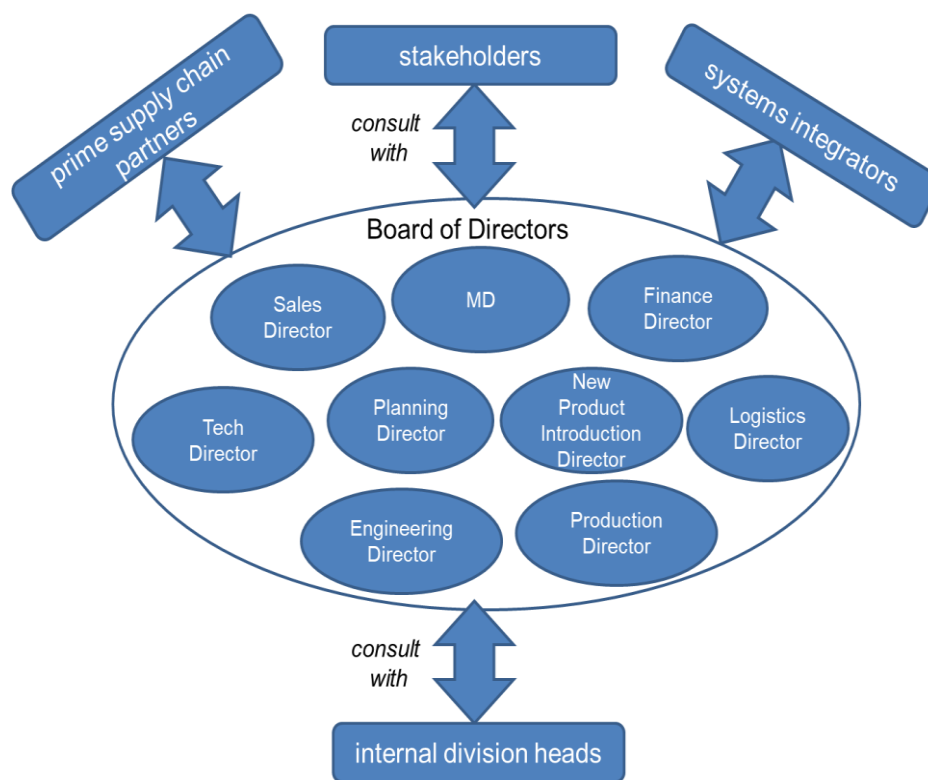


Figure 2: Illustrative composition of the GMS project team for phase 1 of the AO road map

Also generally during phase one, but following the initial change scenario selection, it is recommended that an overall change project champion be assigned and charged initially with developing a draft project plan (for suggested project teams with their meeting timeframes) and an overall project timeframe, and likely programme of budgeting. This initial project plan should be agreed by all key strategic/board members following which the change project can be launched.

Change Project Phase Two:

High level managers should search for initial evidence which allows them collectively and provisionally to select between alternative business futures with their associated business case scenarios, by considering in overview: the AO processes they and other teams must resource:

Here we recommend that facilitated by the project champion a number (possibly 2 or 3 meetings) of key members of the executive board and their chosen advisors should develop their collective thinking initially by creating and progressively detailing two forms of cognitive model; namely a 'resource based cognitive model' and a 'developed version of the reference model of AO, populated with a set of needed high level AO processes'. Figure 2 shows an example form that this RBV model could take.

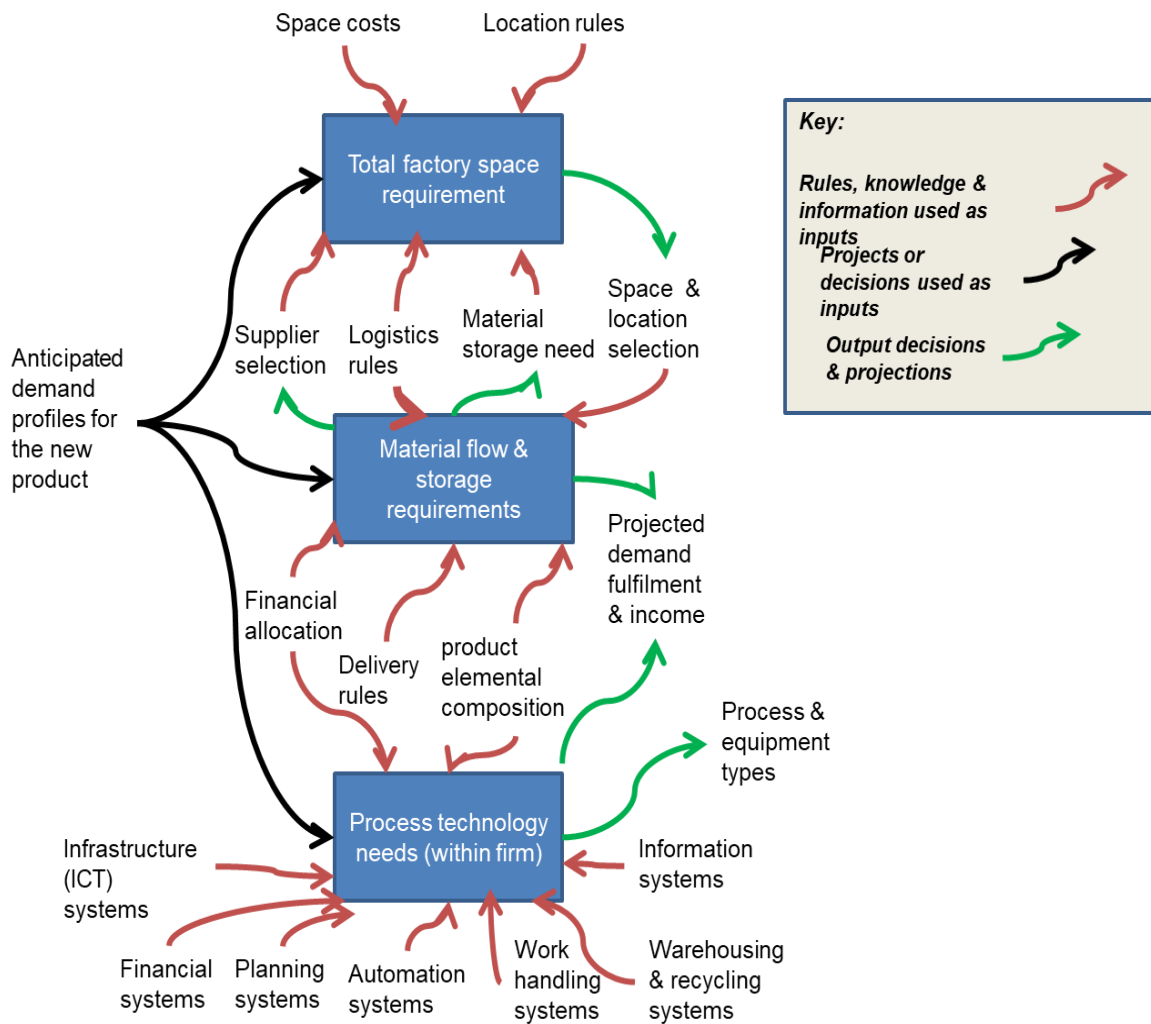


Figure 3: Illustrative scope of cognitive models: to support of "search and election" AO processing

Such a model should begin to show how necessary high level resource based decision making might later be integrated with that of mid-level (and possible lower level) RBV models of the future firm.

Change Project Phase Three:

The project champion and his/her directors and advisors should use the phase one and two high level cognitive models agreed by senior managers (in addition to emerging mid-level and lower level cognitive models as they are developed) to define necessary managerial & technical resource requirements, both for each thread of AO processing and for the change project as a whole.

Change Project Phase Four:

"mid-level managers should begin to identify and flesh out the mid-level asset transformations required in addition to the mid-level AO configuration processes necessary to fulfil those transformations defined by senior managers and thereby the overall project goals"

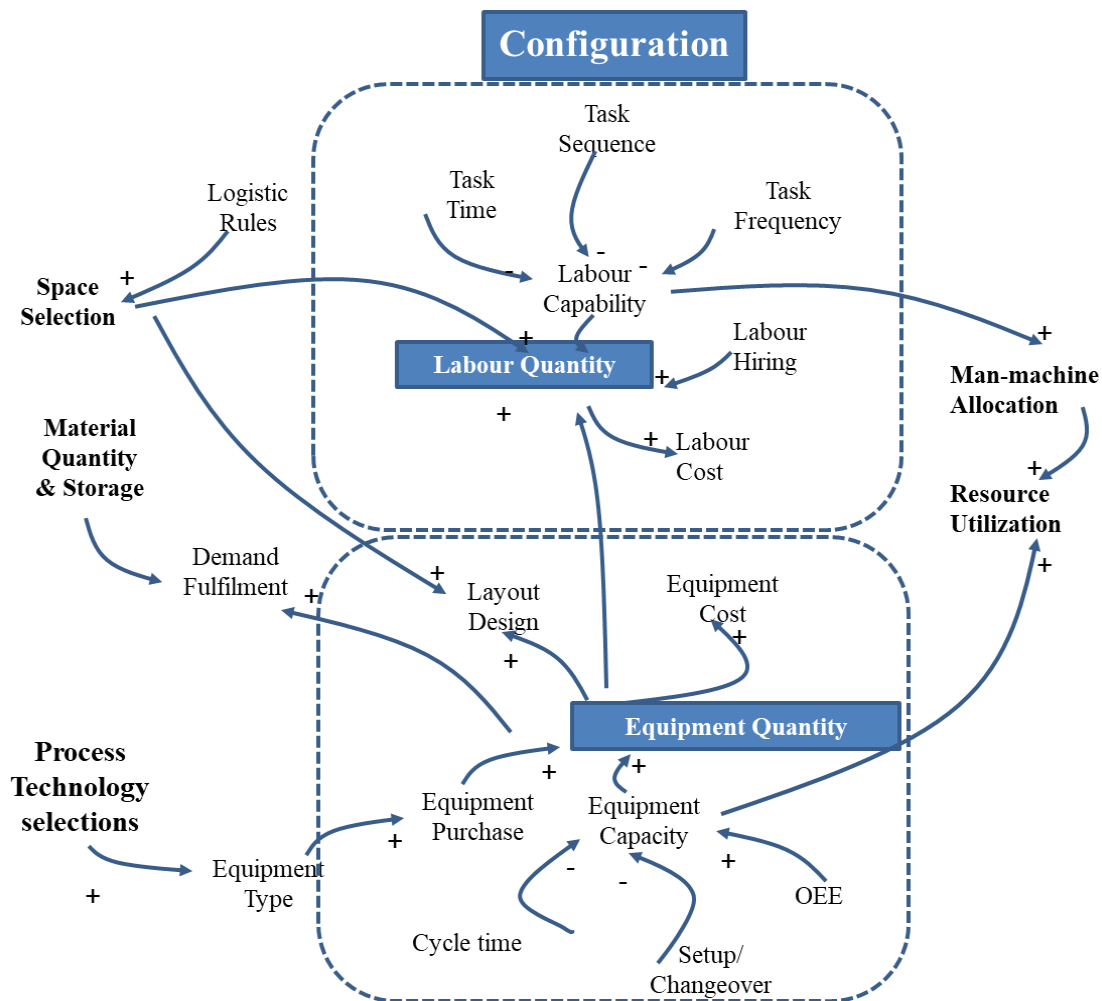


Figure 4: Illustrative scope of cognitive models: to support of "configuration" AO processing

The draft mid-level RBV and AO configuration processes should both be fleshed out and agreed amongst all relevant mid-level managers and in consultation with the project champion, so as to plan and justify the release of project resources. Critically the mid-level cognitive models so developed should be coherent with their higher and lower level counterparts; to ensure that holistic thinking is enabled and all needed knowledge, information and asset transformations are harmonised.

Change Project Phase Five:

lower- level managers should begin to identify and flesh out low level (deployments) in terms of asset transformations required and the low-level AO configuration processes necessary to fulfil those transformations and thereby the overall project goals

The timing of low level managerial decisions made during phase five of the change project is also likely to be largely asynchronous with that of decision making during phases two, three and four and there will be causal dependencies between those phases with information and knowledge and possibly team memberships shared.

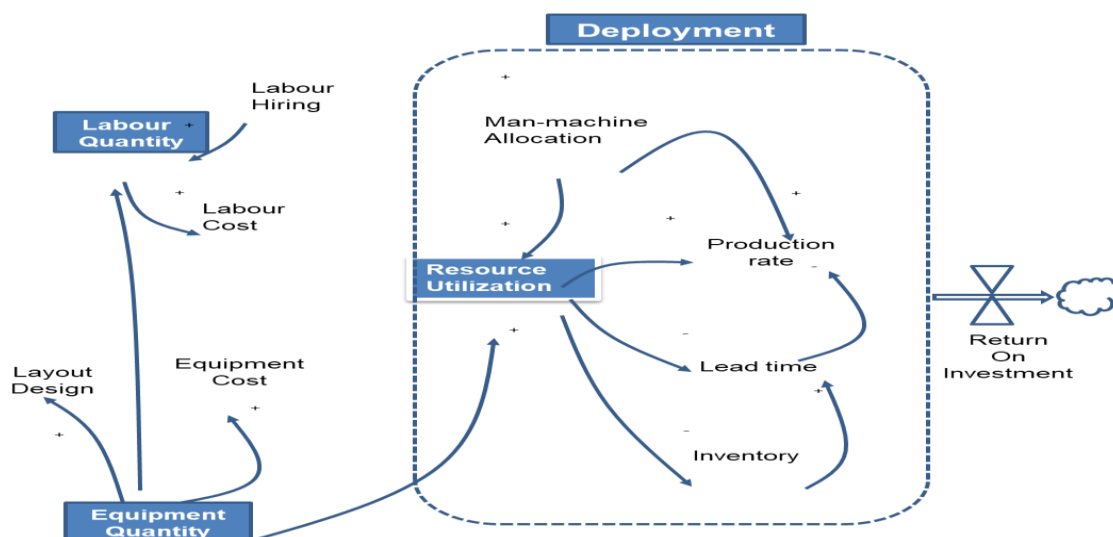


Figure 5: Illustrative scope of cognitive models: to support of "deployment" AO processing

In consultation with the project champion, during phase five meetings the relevant low level managers should also use the reference model of AO as a cognitive basis for tabulating change case specific information. Thereby listing specific sets of 'low-level deployment AO processes' needed, in association with their 'target assets' and 'supporting information requirements'.

Change Project Phase Six:

A team of high and middle level managers, advised by the project champion, should collectively construct, develop and deploy one or more causal loop maps (namely cognitive models for predicting the dynamic behaviours of complex systems).

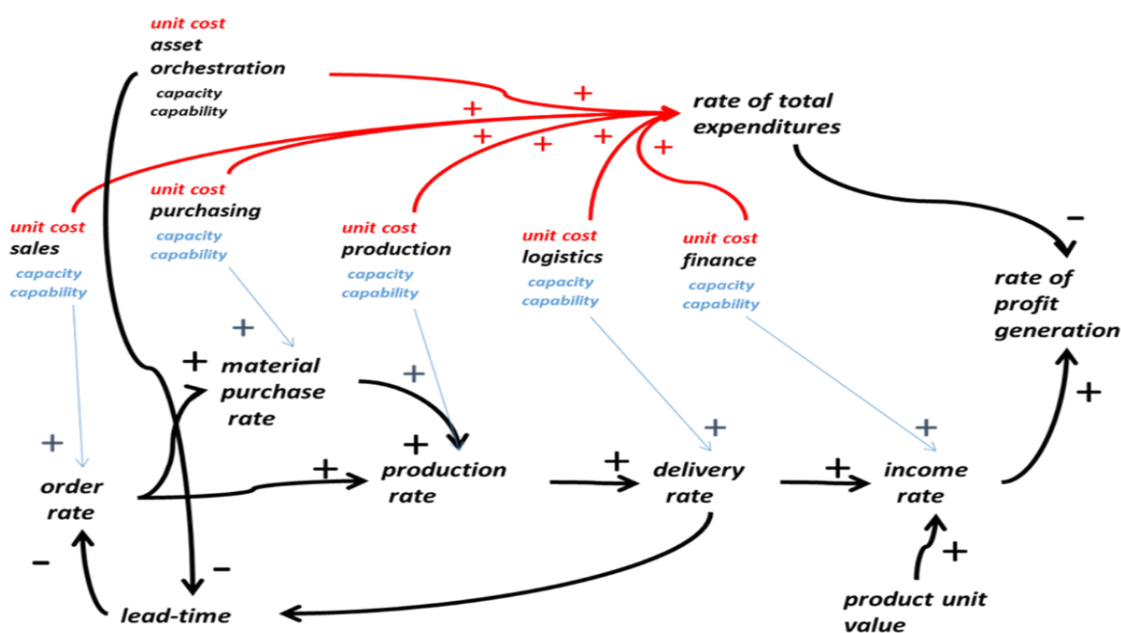


Figure 6: Illustrative use of Causal loop modelling to produce future outcomes of investment into an enterprise

This analysis and ensuing prediction could then be used to drive the design, acquisition, configuration, etc. of relevant entities described within [Figure 7](#) and other cognitive models used during the change project (such as the RBV models)

Clearly our example [Figure 6](#) was designed to encode specific structural and temporal dependencies between elements of the GMS enterprise.

Change Project Phase Seven:

The project champion should collate a collage of the cognitive models that have been used to support the collective modelling of the several project teams. Such a collage will begin to document decision rationales for the overall project; along with the proposed and actual assignment of project and sub-project (financial and human) resources and responsibilities, possibly needed (for accountancy purposes).

[Figure 7](#) shows how earlier example RBV cognitive models might be integrated into a more holistic RBV cognitive model. Furthermore, the above illustration supports the previous studies, which argue that the skills of internal integration capabilities support effective internal communication and coordination of AO processes ([Helfat et al., 2009](#)).

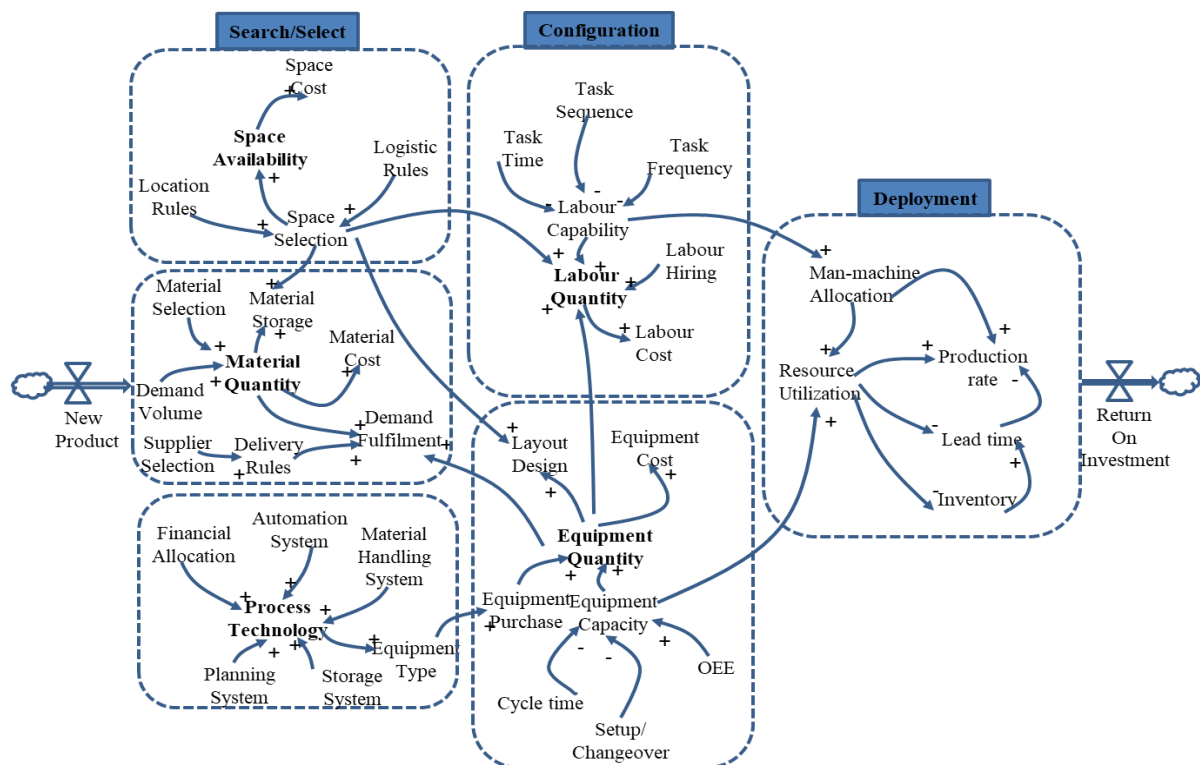


Figure 7: illustration use of collective cognitive modelling to integrate AO processing and its multi-level decision making

Discussion

Notwithstanding the social and operational complex nature of the business of

different firms, and of their changing business environment and required AO processing, [Figure 1](#) was found to provide a simple and graphic reference model of suitable AO thinking and how this could be applied by related managers; in all case studies investigated by our research team. Thereby we posit that our case study results have begun to provide organisational clues as to how AO projects can be successfully achieved; even though the firms we studied have required distinctive forms of organisational and operational change. Thus far we observed that the system dynamics modelling processes were providing a generally useful research method for theory building

In seeking to address these outstanding literature gaps, the present authors have (1) conceived and case tested a graphical representation of emergent AO literature, in the form of a proposed 'reference model of AO processing', and (2) defined an associated multi-phase framework for deploying that AO reference model in support of firms that need to facilitate transformational change.

Initially in graphical form the AO Reference Model was proven to support collective thinking about (i.e. characterising and classifying procedural aspects of) large scale change projects within enterprises. Particularly in its original form the reference model was simple to use and proved useful as a means of structuring the questioning/interviewing of managers that previously had contributed to the development and deployment of those many collective decisions that were required to achieve a transformational change project by a world leading producers of semi-conductors. Therefore, this initial use of this reference model partially addressed literature gap (1); by helping to structure the recording of decision making and key outcomes associated with necessary AO processing within a world class firm ([Mansoor et al., 2021](#)). Indeed, a further outcome of this structured interviewing was a documented case study example of emergent AO thinking in action ([Al-Sabaawe et al., 2018](#)); which in itself usefully extends the base of emergent AO literature, by providing concrete examples of mappings between needed AO processes, and related well- structured AO decisions and actions, leading to consequent asset transformations.

But because of the extreme levels of project complexity involved, the efficacy of his actions was necessarily (1) dependent upon his personal capabilities, experience, motivation and availability and (2) was potentially a subject of high risk of intervention from powerful vested interests. Furthermore, despite the criticality, major investment costs involved and urgency of the change project studied essentially even the various building block elements of this transformational change project had been configured by GMS managers in an essentially ad hoc and piecemeal way.

Bearing in mind the enormous potential risk observed consequent upon possible poor transformational change project design, during their research reported herein the present authors conceived alternative means by which collective (multi-stakeholder,

multi-level, multi-disciplinary) AO decision making can be enabled within large and medium sized firms seeking to action large and medium scale change projects. This consideration led the present authors to conceive (with reference to both the GMS change case and other industrial, government and educational change cases they have supported) and begin to test a systematic and holistic approach based upon the use (a) their simple reference model of AO, and (b) a decision/action road map which interconnects (c) the collective development and the use of coherent sets of simple cognitive models'. Via coherent use of (a), (b) and (c) in essence a model driven infrastructural integration service can be provided which facilitates systemisation and holism, leading to better and faster change project planning, documentation and on-going potential reuse of the 'in-context' knowledge and information generated.

Conclusion

In their current research the 'systematic approach to AO application' realised via coherent use of (a), (b) and (c) is presently being trialled in two other cases of transformational change in firms; with a view to providing research and consultancy support for the firms involved and to develop further the new knowledge reported herein.

In summary, the paper came up with a new 'systematic approach to AO application' to support and bring together crucial aspects of specific changes in projects within companies. The goal is to maintain competitive behaviors in uncertain environments. Our approach is rooted in the latest AO literature and is both systematic and straightforward. It doesn't dictate specific decisions but outlines the key decision-making phases that should be implemented. The paper also provides examples using cognitive maps, emphasizing the importance of shared ownership and a common understanding among team members, who are likely to be transient, involved in different stages of the change project.

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