Characterizing, Encoding and Visualizing HRM-related Organizational Change Effectors, Affecters and Modulators using Cloud-Storage-based AVODS

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Abstract

Human Resource Management (HRM) issues and practices are often pivotal in determining the success of organizational change. Developmental, transformational and transitional change types are generally influenced by a range of HRM – dependent factors. These factors can be broadly categorized as change effectors, affecters and modulators.

This paper presents a novel technique involving knowledge management and cloud storage-based AVODS (Autonomous Virtual Object Data-Stores) for characterizing salient change effectors, affecters and modulators influential in the oil and gas sector, within a Middle-Eastern context. Proactive management of these AVOD-held HR-related parameters decreases change resistance, and increases levels of employee commitment to organizational change and innovation, boosting the likelihood of success of planned change.

AVODS naturally enhance the process of knowledge externalization, for change related HRM factors, by offering a dynamic, organic and interactive method for capturing, encoding and visualization HRM-related change effectors, Affecters and modulators. We provide examples of AVOD-capture, encoding and visualization of key research findings from a multi-company case study of oil and gas sector organizations in the Gulf region. The change parameters subsumed within AVODS include worker empowerment, autonomy, participation, communication, culture, normative responsibility, training/re-skilling and reward systems.

Keywords: AVODS, Cloud Data-Stores, Knowledge Management, Interaction Circles, Knowledge Diffusion, Knowledge Externalization, Sustainable Change

1. Introduction and Background

Companies in the oil and gas sector have undergone significant change in recent years, driven by technological growth, business competition, market-place issues and public expectations. There is additionally significant volatility in output prices and consequently operating margins. To exacerbate matters technology is continually advancing and non-progressive companies find their organizational set-up outdated and inefficient. To counter this, oil and gas sector firms embark on frequent bouts of change with attendant developmental, and management issues. Most firms in the sector appreciate the need for employees who are adequately trained and motivated, to help maintain a competitive edge.

This paper provides a systematic framework for characterizing and encoding developmental, transformational and transitional change types and determining how these are influenced by a range of HRM – dependent factors. The causal HRM-related factors
are systematically categorized as change effectors, Affecters and modulators (termed EAM factors). This paper will establish which effectors, Affecters and modulators exert the most significant levels of influence in the oil and gas sector; within a Middle Eastern context. For added manageability of the EAM factors we have developed cloud storage-based AVODS (Autonomous Virtual Object Data-Stores) for encoding and visually characterizing salient change effectors, Affecters and modulators. The work carried out, and the development of AVODS, will be of use in allowing people managers to initiate, plan and implement change in a more effective manner.

We can exemplify changes as being developmental, transitional and transformational. The developmental change category seeks to grow an organization’s capacity to perform its functions. This could involve changes to its skills levels, operating and management processes. The key driver for this type of change is the need to minimize the divergence between target and actual performance states. Transitional change refers to change with observable increments in transitioning from current to target states, where the current state is quite different from the desired end state.

So, whilst developmental change enlarges capacity, generating increases in various specified facets of the company’s operations, transitional change re-frames or re-casts structure, strategy and/or culture. Thus with transitional change, the state transitions could be very different along the change trajectory. We can specify drivers for change state transitions as being unilateral or multilateral (participative). Unilaterally driven state transitions are often autocratic and driven by upper/middle management. For successful change under those conditions, there has to be alignment between corporate structure (hierarchical/centralized) and culture (formal/authority-driven). Multilateral or participative state transitions on the other hand are often fully participative, or even democratic, and are driven by middle/lower-cadre teams working in tandem with higher management echelons. This type of change elicits support at all levels for the state transitions, seeking to create empathy and ownership through worker involvement. Studies by Stace and Dunphy [7] map the change driven formats to the change types discussed earlier. So, for example, they recommend the mapping of unilaterally driven change to the transformational change type, primarily for reasons of convenience and the much shorter timescales.

For transitional or developmental transitions, multilaterally driven (participative) change is recommended, since there is greater scope for worker involvement, and longer timescales. Knowledge-Managed HRM (KM-HRM) spans several people-management activities and is applied at multiple levels within the organization. When properly practiced, KM-HRM provides a framework for holistic people management, serving to select, train, motivate and performance manage the company’s workforce. KM-HRM has significant strategic and operational implications. The work we have carried out systematically clarifies specific KM-HRM practices as being effectors, affecters or modulators.

1. Knowledge-Managing change – A precursor to AVODS formulation

Standard change management schemes [1]–[6] are typically linear, with feedback loops often used to regulate and fine-tune the process. It is possible to integrate Knowledge-Management formalism within standard change management (as shown in Fig.1):
Fig. 1. Integrated KM and change management

We term this approach KMCM (Knowledge-Managed Change Management). KMCM manages tacit and explicit change-related knowledge sources within the organization. KMCM is predicated on key Knowledge Management (KM) phases which are in turn based on Socialization, Externalization, Combination (Group-learning and Dissemination) and Internalization KM activities. Approaches of this nature are termed SECI-based Systemic Models [8]–[12]. We have used SECI-based models to formulate a more relevant and robust framework to underpin the proposed KMCM technique. The derived scheme is shown in Fig. 2 –

Fig. 2. Multi-phased KMCM workflow

We can elaborate further on the KMCM phases –
Phase 1: Initiation of Change Management Processes

Phase 1 entails identification of change stakeholders, change management assets and change effectors, Affecters or modulators (to be defined in the next section) within the organization. It also requires the specification of usable change-defining metrics that conform to ‘SMART’ criteria. That is, they have to be specific, measurable, achievable, relevant and time-bound.

Phase 2: Knowledge Externalization Phase

The previous phase served to collate primary change management knowledge. A significant component of this is tacit or implicit change management knowledge. That is, many strands of the change management know-how are informal and known primarily to specific individuals and/or areas of the organization. In phase 2 we finalize the collation of underpinning tacit or implicit change management knowledge. Within this phase we formalize and render explicit all the main tacit knowledge strands pertaining to change management. A key requirement within this phase is the creation of Change Knowledge Interaction Circles (CKICs) – Small groupings of key personnel involved with change management within the organization (termed the Socialization Sub-phase).

Phase 3: Knowledge Diffusion and Dissemination

Phase 3 starts by expanding the Change Knowledge Interaction Circles (CKICs) into larger learning groups. The CKICs serve as nuclear or seed groupings holding externalized and formalized change management knowledge [14]–[16]. Members of the CKICs are intra-organizational change management experts or super-users. By having them interact formally (and informally) with larger employee groupings, change management knowledge is diffused across the organization. The CKIC – employee interaction generates a group-learning scenario, serving to raise awareness of change management issues and practices.

Phase 4: Knowledge Internalization and Execution

Our discussion of Phase 3 suggested that change knowledge diffusion would, over a period, start to modulate change management behavior with the organization. This is essentially the early phases of change knowledge internalization. In Phase 4, all change stakeholders within the organization will have started to internalize more optimal change management processes and best practices. Additionally, at this point, the organization embarks on a full-scale execution of its change management program(s).

Within the KMCM workflow, a key issue is the detailed characterization of change-related HRM effectors, Affecters or modulators. We will discuss how this is carried out in subsequent sections.
3. HRM Effectors, Affecters and Modulators

The KMCM work carried out systematically clarifies specific HRM practices as being effectors, Affecters or modulators. Effector HRM practices seek to implement people management policies and processes. This includes recruitment activities, disciplinary processes, and job design and performance appraisal. Effector HRM is driven by targets and performance levels. Affecter HRM practices are concerned with building commitment, loyalty and trust within the workforce. Affecters seek to enhance the psychological contract between the company and its employees. Affecter HRM provides the caring and supportive face to HRM. It also strives to elicit participation where this is in alignment with the organizational ethos or culture. Affecter HRM roles include providing mechanisms and policies for benefits, dispute resolution, grievance processes etc. Affecter HRM seeks to minimize worker discontent, and match employee expectations to what the company is able to offer.

Modulator HRM practices provide the necessary control mechanisms for people management. This could include organizing training for re-skilling or up-skilling, and the restructuring of worker reward systems and procedures. Modulator HRM is able to modulate or elevate states induced by effectors or Affecters e.g. changing skills levels of newly recruitment employees through training or improving levels of worker motivation through well designed reward systems. In other words, Modulators can sometimes be viewed as secondary transitioning agents, whilst Effector and Affecter HRM practices are primary influences. Having specified concepts pertaining to KM, change management and HRM, we can proceed to integrate the three strands within relevant parts of the KMCM workflow, as shown previously in Fig.2. Change state transitions are thus affected by the quality and expediency of effector, Affecter and modulator HRM practice. The transitions are also subject to promoter and inhibitor factors.

Change promoters include –

- Favorable (change-embracing) strong organizational culture.
- Management support and commitment to the change.
- Strong worker involvement and clarity about purpose of change.
- Effective communication
- Favorable external environment – e.g. sector with minimal levels of competition.
- Strong leadership.

Change inhibitors include –

- Unfavorable, change–averse or change resistant organizational culture
- Insufficient or no management support
- Low worker involvement, and lack of clarity or transparency of change objectives
- Poor communications (resulting in greater uncertainty)
- Unfavorable external environment
• Short timescales or insufficient time
• Weak leadership

By judicious and effective use of modulator practices, the effects of the various inhibitor factors can be mitigated, or the promoter factors enhanced/strengthened. As an example, a grid can be used to map effectors, Affecters and modulators to some of the relevant change parameters.

Formulating AVODS

AVODS represent multidimensional objects held virtually in cloud-based data stores. AVODS perspectives are held within three perspectives, corresponding to the EAM structure. The EAM perspectives are bound or encapsulated within an AVODS storage cell that includes identification, historical and generational data.

The organization defines its base AVODS structure, and this structure is used to instantiate specific AVODS objects that correspond to planned organizational change. Once the AVODS instance is brought into existence, it becomes a referenced repository for all collected EAM parameters, which determine values and states for AVODS dimensions and perspectives. The AVODS objects use a combination of information push and pull schemes for updating stored values, primarily via cloud or local storage accessed web services predicated on xml data-streams.

Business Intelligence and management scorecards are able to poll coupled AVODS objects to display both visually and textually, salient HRM/Change Management performance data.

3. Methodology of the Study

A multi-company comparative case study of companies in the Middle Eastern Oil and Gas sector was carried out over several months [13]. The study was based on a critical realism research epistemology. A mixed inductive-deductive research approach was used. Data collection utilized a mix of primary and secondary data collection instruments. The primary data was collected using self-completed questionnaires (SCQ) and semi-structured interviews (SSI). Secondary data was used for additional triangulation. The time-frame was essentially longitudinal, with cross-sectional elements. The selected companies had been involved in significant change processes, and stratified samples of HR managers, line managers, training managers and regular employees were used. As previously mentioned, methods triangulation through the use of multiple data collection methods, was carried out, to enhance the degree of validity and reliability of the study.

Essentially, the work identifies the key HRM effectors, Affecters and modulators that influence change management within the organizations, as a prelude to casting these as AVODS with characteristic dimensions and perspectives. The information held in the AVODS related to the change management exercise can thus be visualized as conveniently rendered Kiviat or radar plots.
Study Results

Impact of Communications & Training (Effector & Modulator HRM domains)

![Fig. 3. Impact of Communications & Training](image)

Impact of Level of Commitment to the Company (Affecter HRM domain)

![Fig. 4. Impact of Level of Commitment to the Company](image)

Impact of Determinants of Resistance to Change (Affecter HRM domain)

![Fig. 5. Impact of Determinants of Resistance to Change](image)
Impact of Worker Empowerment & Participation (Affecter HRM domain)

Fig. 6. Impact of Worker Empowerment & Participation

Impact of Level of Consultation about the Change (Affecter HRM domain)

Fig. 7. Impact of Level of Consultation about the Change

Impact of Employee Rewards & Performance Appraisal (Affecter, Effector & Modulator HRM domains)

Fig. 8. Impact of Employee Rewards & Performance Appraisal
Impact of Mode of Appreciation for Contribution to the Change (Affecter HRM domain)

Fig. 9. Impact of Mode of Appreciation for Contribution to the Change

Impact of Level of Job Expertise/Task-Role Autonomy used (Effector HRM domain)

Fig. 10. Impact of Level of Job Expertise/Task-Role Autonomy used

Casting and Visualizing AVODS Footprints

**HRM Effector Perspective AVODS footprint**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communications - Peer level discussions related to change</td>
<td>5</td>
<td>Performance – Worker performance levels/attributes from appraisals</td>
</tr>
<tr>
<td>2</td>
<td>Communications - Vertical discussions pertaining to the change</td>
<td>6</td>
<td>Performance – Managerial performance attributes from appraisals</td>
</tr>
<tr>
<td>3</td>
<td>Job Design - Work variety</td>
<td>7</td>
<td>Expertise - Base-level qualifications</td>
</tr>
<tr>
<td>4</td>
<td>Job Design - Task autonomy</td>
<td>8</td>
<td>Expertise - Job-related training</td>
</tr>
</tbody>
</table>
HRM Affecter Perspective AVODS footprint

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
<th>Dimension</th>
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<tbody>
<tr>
<td>1</td>
<td>Support – Level of support for teamwork</td>
<td>5</td>
<td>Consultative – Level of consultation regarding the change</td>
</tr>
<tr>
<td>2</td>
<td>Affective – Loyalty-levels and commitment</td>
<td>6</td>
<td>Appreciative – Degrees and modes of appreciation to workers</td>
</tr>
<tr>
<td>3</td>
<td>Resistive – Levels of resistance to change</td>
<td>7</td>
<td>Time-horizons – Adequacy of time allotted to the change</td>
</tr>
<tr>
<td>4</td>
<td>Empowerment – Degree of employee empowerment</td>
<td>8</td>
<td>Grievance and dispute resolution mechanisms</td>
</tr>
</tbody>
</table>

Fig. 11.HRM Effector Perspective AVODS footprint

Fig. 12.HRM Affecter Perspective AVODS footprint
### HRM Modulator Perspective AVODS footprint

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>People Management – Leadership style(s)</td>
<td>5</td>
<td>Reward Systems – Incentives and bonus schemes</td>
</tr>
<tr>
<td>2</td>
<td>People Management – Managerial attitudes &amp; profiles</td>
<td>6</td>
<td>Change Mission – Clarity of change goals and objectives</td>
</tr>
<tr>
<td>3</td>
<td>Organizational Culture – Change supportive cultures</td>
<td>7</td>
<td>Workplace Atmospherics – Work environment</td>
</tr>
<tr>
<td>4</td>
<td>Organizational Culture – Degree of diversity and sub-culturing</td>
<td>8</td>
<td>Change Inertia &amp; Fear Factor – degree of certainty about change outcome</td>
</tr>
</tbody>
</table>

**Fig. 13.** HRM Modulator Perspective AVODS footprint

### 5. Comments and Conclusions

Varying levels of Effector, Affecter and Modulator HRM practices were used by the companies during the period of change, with the qualitative responses and perceptions shown in the charts. In a majority of cases, the changes were judged to be difficult, and the overall conclusion was that more judicious use of the prevailing HRM Effector, Affecter and Modulator practices, within a KMCM scheme, would have resulted in more efficient and effective change processes. Having identified and partly characterized the HRM Effector, Affecter and Modulator elements using AVODS footprints, renders their integration within the KMCM more straightforward, to provide more assured and successful change management.
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