

ACTION-BASED ANALYSIS OF BUSINESS PROCESSES

¹Reuven Karni and ²Maya Lincoln

¹ Shenkar College of Engineering and Design
12 Anna Frank Street, Ramat Gan 52626, Israel

² William Davidson Faculty of Industrial Engineering and Management
Technion, Israel Institute of Technology, Haifa 32000, Israel

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Abstract: We suggest a method for supporting the management of a business process suite through reliance on an action-based viewpoint. We abstract the action verb from each process descriptor, and perform a verb frequency analysis. Through a Pareto approach those common to a large number of processes are identified. Semantic analysis of these significant actions provides three directions for BPM support: locating actions in the planning, execution or control domain; identifying common procedures to be implemented; and ascertaining where operational consistency and coordination is required between organizational units.

1 INTRODUCTION

A specific enterprise process model encompasses a set or suite of business processes implemented in that enterprise. However, there is a lack of an enabling science to apply the model directly to guide the formulation of procedures specifications and standards within a BPM framework, especially when the suite contains a large number of processes (Lincoln and Karni, 2003). In this paper we create a direct connection between the model and BPM, addressing processes as a whole, rather than in isolation, and seeking to understand the totality of processes, their boundaries and interrelationships (Maddern et al, 2004). We (1) demonstrate a methodology for perceiving a process suite through semantic understanding of the action incorporated in each process; (2) examine the set of actions to determine those common to a large number of processes; and (3) interpret and exploit these significant actions in order to guide the formulation of procedures, specifications and standards for BPM. The outcome of the process descriptor analysis is a study of management area – determination of the management domain to which the action belongs (plan/execute/control) and thus enable better assignment of process management responsibility; significant actions – identification of significant actions which should be the focus of business

process management and formulation of procedures and standards for process quality related to these actions; and cross-functionality – noting which actions occur in several functionalities and therefore require operational consistency between organizational units or sub-units.

2 ACTION-BASED CONTENT ANALYSIS

Fundamental definitions:

- *Process descriptor*: a verb phrase used to describe the content of a business process
- *Process content*: lexical and semantic interpretation of the set of basic linguistic units comprising the descriptor
- *Predicate*: one of the two main constituents of a process descriptor, containing an action (verb) and its qualifiers
- *Action*: something done or carried through
- *Pareto analysis*: selection of a limited number of process actions that produce a significant overall effect, based on the principle that not all of the causes of a particular phenomenon occur with the same frequency or with the same impact
- *Pareto list*: a list of process descriptors or actions, sorted in descending order of the action verb frequency within the process suite

- General *process content analysis* comprises a set of procedures for collecting and analysing descriptors of all business processes within a given suite and making inferences about the characteristics and meaning of the actions realized and the objects created or modified by these processes within the context of the suite. Action-based content analysis focuses on the action verb; the corresponding object-based based content analysis focuses on the object noun. This paper deals with content analysis of the action verb.

For example, the process “Negotiate purchase order conditions with supplier” indicates the action of “negotiating”. We search the process suite being analyzed to find all negotiation processes. If many processes concern “negotiate”, a general negotiation protocol needs to be established, specifying the necessary authority for workers to set conditions and make decisions, and training them how to negotiate (e.g., with customers, suppliers, sub-contractors, potential employees).

Our action-based analysis encompasses the following steps:

- (a) Create a Pareto list of action verbs
 - (1) Standardize process descriptors in terms of verb, noun and prepositional phrases.
 - (2) Compile a list of verbs.
 - (3) Check for operational synonyms for each verb (e.g., approve / authorize; evaluate / rate) and combine these verbs.
 - (4) Count of the number of processes in which each verb occurs.
 - (5) Order the verbs in descending count order.
 - (6) Using the Pareto principle, determine which verbs are common to a significant number of processes (= “significant action”).
- (b) Carry out the following action-based analyses:
 - (7) *Management area*: determine to which management domain each significant action belongs (plan/execute/control). This influences factors such as the action time window, the vocabulary of a procedure or specification, and the category of both managers and workers involved.
 - (8) *Significant actions*: identify significant actions to be the focus of business process management. This pinpoints areas for creating procedures and standards for process execution and quality related to the significant actions.
 - (9) *Cross-functionality*: note which actions occur in several functionalities. The corresponding processes will require operational consistency between organizational units or sub-units.

3 ILLUSTRATIVE EXAMPLE

We illustrate the process through a hotel front desk (HFD) process suite. The suite comprises 136 processes (cf. Karni and Meiren, 2005). A number of these processes, *categorized by function*, are detailed in Table 1 (lefthand column). The suite includes 32 distinct actions (Table 2). The eight most common verbs, covering 88 processes, are: (1) provide information (35 processes); coordinate (10); handle (10); manage (8), issue (7); create (6); charge (6); and maintain (6). When the set of 136 processes is grouped by verb and ordered is descending verb frequency, we obtain an *action viewpoint* of the same suite (Table 1 – righthand column). Juxtaposition clearly shows the contribution of the action viewpoint in helping to grasp the “totality” of the process suite. Action-based analysis provides the following insights:

(1) *Plan/execute/control*: The eight most frequent verbs encompass two areas: execute (provide information, coordinate, handle, manage, issue, create, charge); and control (maintain data bank). As expected, the HFD is operations-intensive; BPM support is required up front and must be harmonized with the activities of the front desk staff.

(2) *Control*: The following procedures and specifications should be established for the significant actions:

- *Provide (information to guest)*: specify a comprehensive database for all information to be provided to staff and guests; “advertise” information services offered; set up a procedure to ensure continued updatedness of the data
- *Coordinate (with other hotel departments)*: set up a procedure to ensure coordination and cooperation between hotel departments; set up a procedure for collaborative processes and progress reporting of guest request implementation
- *Manage (lobby)*: formulate a clear guide for lobby administration; set up a procedure to coordinate with further hotel departments (e.g. advertising, event hosting, maintenance)
- *Issue*: provide computerized and/or hard-copy templates for clarity, completeness of recording, and transparency towards the customer
- *Create (reservation)*: establish a procedure to ensure that all reservation channels and methods of confirmation are consistent and coordinated; set up a procedure to ensure that all reservation data is unified within the reservation database; organize training for frontal or distance

encounters with guests with emphasis on service and on cultivation of guests

- *Charge (room and services)*: specify charges that are unambiguous and understandable to staff and guests; ensure that charge schedules are easily accessible to staff and guests; set up a procedure to ensure updatedness of all charges
- *Maintain (historical data)*: implement a procedure to ensure data updatedness and completeness; set up an efficient system for data entry database integration; set up procedures for analysis and interpretation of historical data and feedback of lessons learned

(3) *Cross-functionality*: The cross-functionality matrix (Table 3) indicates the functions within which the actions take place.

From a *functional* viewpoint we see that:

- *Provide (information to guest)*: information is provided to guests by the front desk within multiple contexts (rates and yields, check-in, guest relationships and guest information services). Management must decide whether the staff will be trained to act as generalists or specialists when advising guests.
- *Coordinate (with other hotel departments)*: these activities occur mainly within the service support coordination management function.
- *Handle (items on guest record)*: cancellations, complaints and queries are dealt with within multiple contexts (reservations, check-in, guest relationships). Management must ensure that the staff is trained in handling anticipated, unanticipated or unpleasant interactions when facing guests at the front desk.
- *Manage (lobby)*: these activities only occur within the front-desk zone function.
- *Issue (documents)*: documents are issued to guests within multiple contexts (reservations, check-out and guest relationships). Management must decide whether the staff will be trained to act as generalists or specialists when issuing documents.
- *Create (reservation)*: these activities only occur within the reservation management function.
- *Charge (room and services)*: guests are charged within multiple contexts (reservations and guest relationships). Management must ensure that charging is coordinated and no duplication of charges occur.
- *Maintain (historical data)*: these activities occur within the special databank management function.

In summary, we see that the HFD process suite can be partitioned into those with actions common to several processes (65%) and those with relatively singular actions (26%); the number of frequent actions based on the Pareto principle, is relatively small (8 actions cover 88 processes). Hotel management can therefore focus on developing a reasonable number of procedures, specifications and standards which will encompass about 2/3 of the processes in the HFD domain.

4 CONCLUSIONS

Action-based content analysis describes what the business *does* (“charge”, “authorize”, “check”) through surrogate itemization of a suite of business activities, representing the compass of a specific function, enterprise or industrial sector, in terms of actions. Through the “Pareto effect” – which we have shown does exist – the organization can focus on a restricted number of actions and implement a limited number of common procedures that can produce a significant overall effect. These include coordination and cooperation between organizational units, consistency of cross-enterprise procedures, decisions regarding generalization or specialization of employee training, training for interactions with external agents (e.g., guests), prevention of duplicate or inconsistent transactions, and specification of an integrated infosystem for process support. It is hoped that BP practitioners and managers will be able to use the approach to understand the totality of a business suite and to create an *action profile of the organization*.

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Table 1: Hotel Front Desk processes – function and action viewpoints.

(a) Functional viewpoint	(b) Action viewpoint
<p>1 Reservation management</p> <ul style="list-style-type: none"> • Check current room availability and status for reservation • Check future room availability and status for reservation • Search available units for specified date range and unit capacity <p>2 Rate and yield management</p> <ul style="list-style-type: none"> • Provide information on regular rates • Provide information on seasonal and weekend rates • Provide information on special rates <p>3 Check-in management</p> <ul style="list-style-type: none"> • Welcome regular guest • Check in guest arriving on time to reserved room • Provide information on alternative means of payment <p>4 Check-out management</p> <ul style="list-style-type: none"> • Issue check-out invoice with list of guest fees • Accept credit card payment • Issue final receipt <p>5 Guest relationship management (guest services)</p> <ul style="list-style-type: none"> • Handle guest queries • Charge additional services to guest record • Arrange car rental for guest • Handle complaints <p>6 Guest information service management (hotel amenities)</p> <ul style="list-style-type: none"> • Provide information on meal timetables • Provide information on hotel facilities • Provide information on hotel shop <p>7 Guest information service management (external amenities)</p> <ul style="list-style-type: none"> • Provide information on vehicle rental agencies • Provide information on tourist agencies • Provide information on restaurants <p>8 Communication management</p> <ul style="list-style-type: none"> • Record and/or post messages for guest • Enable guests to receive e-mail messages • Enable guests to send e-mail messages <p>9 Service support coordination management</p> <ul style="list-style-type: none"> • Coordinate guest request with housekeeping • Coordinate guest request with maintenance • Coordinate guest request with room service <p>10 Front desk zone management</p> <ul style="list-style-type: none"> • Manage front desk (including flowers) • Manage lobby billboard(s) • Manage ambient music • Manage clock-in clock-out <p>11 Special databank management (hotel services)</p> <ul style="list-style-type: none"> • Maintain wait list for reservations • Maintain historical data on guests • Maintain historical data on complaints 	<p>Provide</p> <ul style="list-style-type: none"> • Provide information on flight schedules • Provide information on means of payment • Provide information on city maps and guides • Provide information on cultural attractions • Provide information on currency exchange rates • Provide information on hotel facilities • Provide information on countrywide weather • Provide information on medical services • Provide information on organized tours • Provide information on vehicle rental agencies <p>Coordinate</p> <ul style="list-style-type: none"> • Coordinate guest request for wake-up call • Coordinate guest request with computing • Coordinate guest request with housekeeping • Coordinate guest request with laundry facility • Coordinate guest request with maintenance • Coordinate guest request with restaurant • Coordinate guest request with room service <p>Handle</p> <ul style="list-style-type: none"> • Handle cancellation telephonically • Handle cancellation via Internet • Handle complaints • Handle guest queries • Handle credit card invalidity • Handle dinner reservation for guest <p>Manage</p> <ul style="list-style-type: none"> • Manage cash drawer • Manage clock-in clock-out • Manage front desk (including flowers) • Manage front desk audit • Manage lobby • Manage lobby billboard(s) • Manage night audit <p>Issue</p> <ul style="list-style-type: none"> • Issue check-out invoice with list of guest fees • Issue final receipt • Issue safe receipt • Issue reservation confirmation letter and send <p>Create</p> <ul style="list-style-type: none"> • Create reservation frontally • Create reservation telephonically • Create reservation via Internet <p>Charge</p> <ul style="list-style-type: none"> • Charge room at time of reservation • Charge room at check in • Charge additional services to guest record <p>Maintain</p> <ul style="list-style-type: none"> • Maintain historical data on guests • Maintain historical data on DNRs • Maintain historical data on complaints

Table 2: Pareto distribution of the verbs for the “Hotel Front Desk” function.

#	Verb	Processes	#	Verb	Processes
1	Provide (information)	35	17	Deliver	2
2	Coordinate	10	18	Offer	2
3	Handle	10	19	Search	2
4	Manage	8	20	Swipe	2
5	Issue	7	21	Welcome	2
6	Create	6	22	Adjust	1
7	Charge	6	23	Allocate	1
8	Maintain	6	24	Arrange	1
9	Enable	5	25	Confirm	1
10	Check	4	26	Direct	1
11	Check-in	4	27	Order	1
12	Accept	3	28	Record	1
13	Check-out	3	29	Replace	1
14	Select	3	30	Specify	1
15	Supply	3	31	Transfer	1
16	Add	2	32	Verify	1

Table 3: Cross-functionality matrix (significant actions) for the HFD example.

Action/function	1	2	3	4	5	6	7	8	9	10	11	Total
Provide (info)		4	3		1	9	18					35
Coordinate					1				9			10
Handle	5		1		4							10
Manage										8		8
Issue	2			2	3							7
Create	6											6
Charge	3				3							6
Maintain (data)											6	6

Key (see Table 1 – lefthand column): 1: reservations; 2: rates and yields; 3: check-in; 4: check-out; 5: guest relationships (guest services); 6: guest information services (hotel amenities); 7: guest information services (external amenities); 8: communication management; 9: service support coordination management; 10: front desk zone management; 11: special databank management (hotel services)).