RESEARCH PAPER

Streamlining the Planning Approval Process for a Sustainable Urban Development – A Case Study for Unwinding Manmade Complexities

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ABSTRACT

The urban development process displays regressive tacit-dominant knowledge areas and their tacit level would impede their movements during multi-level knowledge transfers among stakeholders. The accuracy of a knowledge may be distorted when recipient stakeholders fail to understand a specific knowledge for its purpose. Earlier studies by the authors had highlighted complex yet dynamic environmental operating environment in most planning approval procedure. The paper presents a recent completed doctoral study which attempted to apply the Malaysian One-Stop Centre planning process for the city of Accra, Ghana. It centres on the Discontinuity in Organizations (D-I-O) theory which proposes "Knowledge" as the seventh Contingency Factor in managing knowledge flows in such operating condition. The theoretical foundation describes how four dynamic operating characteristics which-when combined and not well-mitigated-could lead towards organizational performance failures hence the projects' socio-economic failures in providing adequate housing to the masses. There is a need for awareness and understanding of the multiple organizations involvement, the mixture of sequential and concurrent workflows, high interdependent tasks, and regressive nature of tacit knowledge throughout the different phases of an urban project's lifecycle development process. The paper discusses the impacts on the organizations involved and how to mitigate them effectively to achieve an inclusive sustainable urban development. The paper presents the potential of streamlining the complex planning approval process which could improve management of a seemingly less understood tacit world of property development into a formidable sustainable urban development strategy.

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INTRODUCTION

The urban development process displays regressive tacit-dominant knowledge areas and their tacit level would impede their movements during multi-level knowledge transfers among stakeholders. The accuracy of a knowledge may be distorted when recipient stakeholders fail to understand a specific knowledge for its purpose. Earlier studies by the authors [1], [2], [3] & [4] had highlighted complex yet dynamic environmental operating environment in the planning approval procedure.

Complexity of the urban planning process is matched with the urgency of approving urban infrastructure and building projects to meet the demand growing

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population in cites. Planning permission is an essential planning regulatory tool used to maintain and control property developments. In Malaysia, unlike many countries, the procedures of acquiring planning permission are constitutionally formulated. In brief, planning permission can be defined as an authorization required by an applicant to have a full right to build by complying with the regulations that governs land use. These regulations are usually under a Town and Country Planning Act and it differs from country to country and place to place. It usually involves political intervention in consultation with professionals (planner).

According to [5], the laws, procedures and guidelines pertaining to the property development process in Malaysia are quite extensive. In his evaluation, there are over fifty (50) laws and guidelines that may either be initiated or pose a constraint on decisions when undertaking a property development project. Those most pertinent and crucial laws to be complied to include the National Land Code (NLC) 1965 [6], the Town and Country Planning Act, 1976 (Act 172), the Government Act 1976 (Act 171), Uniform Building By Law 1984 (UBBL), the Street, Drainage and Building Act 1974 (Act 133) and the Environmental Quality Act 1984. [5] highlighted a very important tool used to manage land development is the planning control which is referred to in Part IV of the Town and Country Planning Act [7], 1976 (TCPA) and planning guidelines. In Section 19, the TCPA states that "no person, other than the local authorities, shall, commence, undertake, or carry out any development unless planning permission in respect of the development has been granted to him under Section 22 (treatment of application or extended under Subsection 24 (3).

In one study by [8], the scholar highlighted the importance of making the planning process a success largely depends on the political will, participation, technical capacity and the institutionalization of plan management. Hence, the paper presents a case study in Accra, Ghana on its attempt to streamline its planning approval process to follow Malaysia's OSC process. The case study will highlight challenges including interdepartmental organization and manmade complex workflow which could be improved distinctively by each city following its socio-cultural preferences. Then, it discusses how the Discontinuity in Organizations (D-I-O) theory can provide background understanding about the the complex knowledge flows activities within and along the project development lifecycle process for decision-makers to make informed decisions for their respective cities.

Literature Review

About One-Stop Centre

The literature provides description on the Malaysian OSC (One-Stop Centre) as a model because of its recent developments in planning approval, for instance the electronic submission (e-submission) of applications and electronic approvals (e-approval) which has been introduced is helping to curtail the approval delays [9] . The system was piloted by DBKL in 2008 and lunched in 2009. The public service of OSC is aimed to be transparent, fast and efficient to increase the nation's productivity and strengthen investor's confidence towards property development services [10]. Figure 1 illustrate the early flow chart of concurrent application for proposal development within 6 months by all local governments under the [11].

Before 2007, there were many problems facing the local authority, such as delay and other associated problems. Ministry of Housing and Local Government (MHLG) adopted a new approval system called the OSC to shorten the time duration and to solve the problems they were facing. With this new system, an application is submitted by an applicant at the division without going to the various agencies. There are about 14 agencies including other technical agencies involved in assessing the application taking into consideration the regulations and all the by-laws that govern the approval system. As illustrated by [5], the former traditional system of planning approval in Malaysia was heavily regulated through a provision of laws. Therefore, the MHLG acknowledged the complexity involved and initiated the thorough analysis from both a technical and a legal perspective to simplify the process. Most significant is to look into the planning approval system due to its complex and numerous Acts involved. Figure 2 shows the different sequential and concurrent departmental tasks between the former and new OSC System for Malaysia.

The OSC system requires checking from the respective agencies, comments and referring of plans and drawings to various technical departments at various levels, in-house departments, related agencies and so forth. The departments and the agencies involved have 25 days to assess and respond with

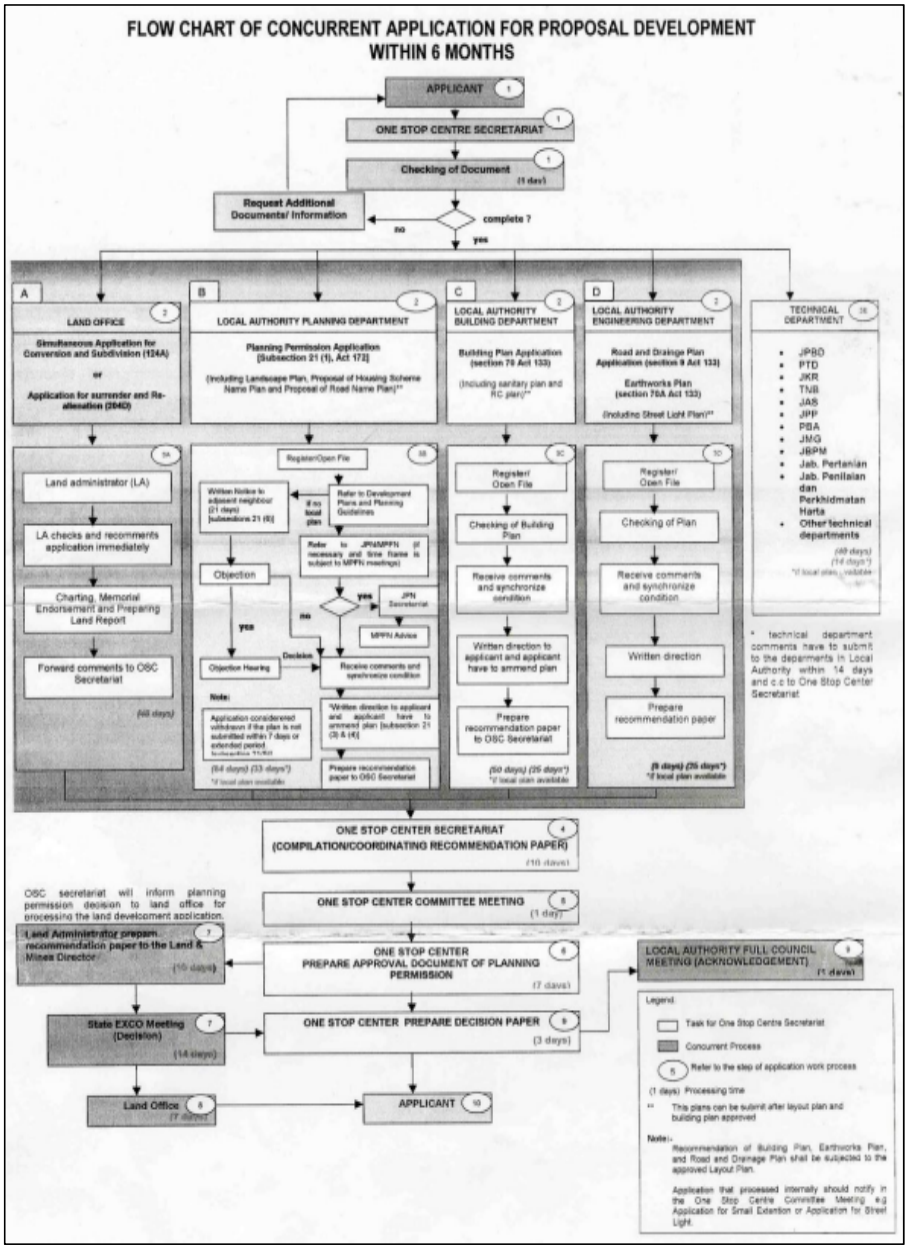

Fig. 1: Flow Chart of Concurrent Application for Proposal Development within 6 Months (Source: [11]).

their comments based upon the plan submitted. The technical committee meets once or twice every week to assess and approve planning permits. Unlike the old traditional system, the Certificate of Completion and Occupation (CCC) is being issued by the Principal Submitting Person (PSP). The principal PSP is assigned from the beginning of the development [12].

In 2008, the Kuala Lumpur City Hall (locally known as *Dewan Bandaraya Kuala Lumpur* or DBKL) embarked on a pilot study initiated by Ministry of Housing and Local Government [11] to implement OSC online submission and approval system to ease human traffic at the OSC offices and to avoid other personal interactions. The OSC is not an autonomous

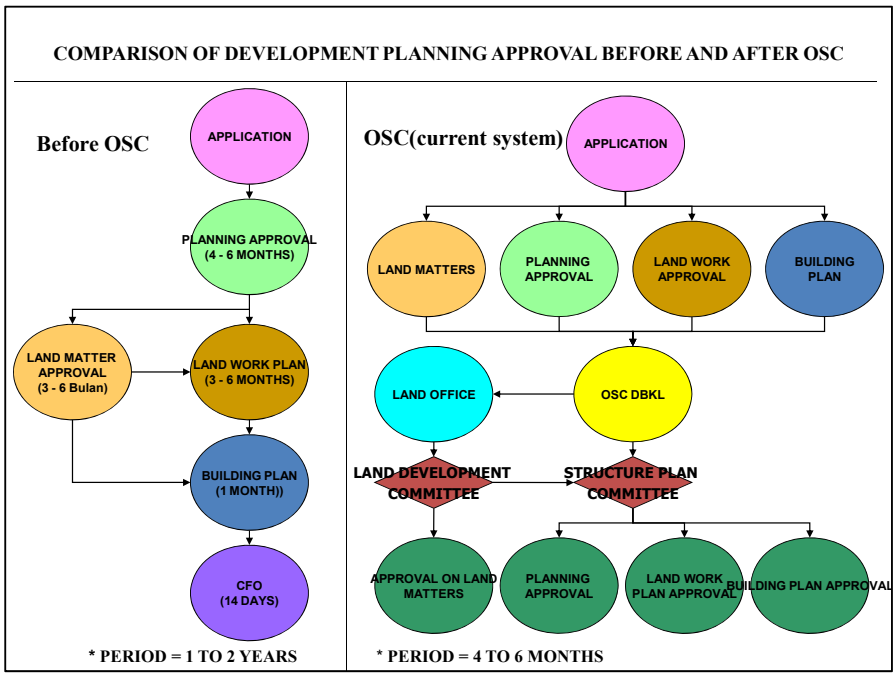

Fig. 2: Comparison between Traditional and OSC Process for Planning Approval within 6 Months (Source: [13])

body. However, through the local authorities and Land Office, it functions as a collective entity to process all types of development proposals such as planning approval, approval of building plans, engineering plans and land matters. The OSC was officially gazetted through the Kuala Lumpur City Hall on 3 July 2007 to improve on the approval processing [14]. The OSC requires the processing of development proposals within 4 to 6 months, as compared to 1 to 3 year previously experienced. Also, the system categorized various approval types, up to 32 listed by Ministry of Housing and Local Government that can be processed by OSC.

About Discontinuous Memberships in Dynamic Knowledge Flows

In organizations such as planning agencies, team members make a cooperative contribution and effort to achieve a common goal by processing planning approval applications. The workflow process, however, may need some of the team or agencies members to be 'discontinued' in order for other skilled personnel to join to make use of specific knowledge and skill type [1] . The various team members must follow the workflow functional workflow process and guidelines and whatever means are available for a better outcome. During this functional workflow process knowledge flows within and among the various team members results in them 'interdepending' on one another for information. Knowledge flow therefore plays an important role in promoting task interdependence effectiveness. In Planning, looking at the Knowledge factor requires an intense study of the various organizations involved, in terms of structure and work interdependencies. However, task interdependence may not always be an optimal form for workflow process and knowledge flow integration. At times, team members' workflow process does not necessitate shared task and interaction but rather individuals within a workflow process. While the contingency factors do offer useful approaches to diagnose problems and design organizations [15] the contingent factors are deficient in addressing cases such as the TCPD delay processing issues. This is because the Contingency factor particularly [15] does not offer any relevancy for understanding the nature of knowledge flow among team members within a workflow process. The authors' recent study [4] found empirical evidence to support [1] who proposed knowledge as a contingency factor and discontinuity as fit which supported and

extended [16] hierarchical information-processing framework. The Discontinuity-in-Organizations [1] theoretical foundation describes how four dynamic operating environmental characteristics which—when combined and not well-mitigated—could lead towards organizational performance failures hence the projects' socio-economic failures in providing adequate housing to the masses. There is a need for awareness and understanding of the multiple organizations involvement, the mixture of sequential and concurrent workflows, high interdependent tasks, and regressive nature of tacit knowledge throughout the different phases of an urban project's lifecycle development process.

Case Study on Streamlining Accra Planning Process Computational Simulation Method in Designing Streamlined Workflow

One case study to share in relation to reviewing and analyzing new planning approval process is a recently completed study by [17] for the City of Accra, Ghana. He utilized a Virtual Design Team Computational Organizational Theory (VDT COT_ system analysis approach to analyzed the results from an earlier qualitative in order to explore the complexity of building permit approval processing. That involved 10 representatives from planning related agencies in one municipality's Town and Country Planning Department (TCPD) in Accra, Ghana. The data was taken within a seven-month period and generated a total of 32 interviews (over 40 hours of recorded data) along with supplemental data, such as participatory observations, team charts, inspections, meetings, documents, and presentations. The TCPD is solely responsible for permit processing but works alongside a committee called the Sub-Technical Committee Meeting (STCM) which represents 10 related planning agencies.

The STCM meets once a week to assess planning applications. The sample taken based on the following set of criteria considered suitable for exploring task interdependence in workflow processes. Each respondent: (1) has experience in planning approvals between 3 to 10 years; (2) was working on planning approvals together with other relevant agencies (team), and are members of the STCM and Metro Meetings; (3) has involvement in decision making of planning approvals; and (4) has knowledge on the planning workflow and knowledge flow process. The study documented a delayed case involving all of the 32 respondents of the STCM.

Using the VDT COT, the workflow process model of the TCPD current approval processing system was formulated consisting of three huge sequential workflows (land matters, STCM assessment and decision workflow) and ten concurrent tasks conducted by the ten respective agency representatives of STCM to represent the actual delayed approval processing case (see Figure 3). The VDT COT approval process represents a set of graphical objects that depict the work process performed by the STCM members to achieve key work process milestones. In the VDT COT simulation model, each project consists of tasks, milestones, positions, meetings, and the various links amongst the parameters. This virtual conceptual design project is analyzed at the Project level.

Baseline Modeling

The parameters of the real case scenarios were set to represent the actual case documented. MEDIUM was set for team experience, HIGH for centralization, HIGH for formalization, MEDIUM for matrix-strength, 0.70 rating for information exchange -probability, 0.01 rating for noise-problem, and 0.7 rating for project-exception-probability. Work volume per full time equivalent is 8 hours/FTE and work days per week is 5 days. Considering the convoluted task volumes in the delayed test cases, the behavior parameters were set for functional-exception-probabilities, and project-exception-probabilities somewhat lower than the normal construction industry practice in order to amplify the effects of task interdependence and knowledge flows effects. The variables and parameters and organization's behaviors and professional knowledge skills (PK-Skills) for the delayed case-baseline are shown in Table 1 respectively.

Alternative Restructured Modeling (ARM)

The ARM case is a streamlined workflow and professional skill network model. Some of variables and parameter settings from the Baseline Model were replicated to allow easy adaptations of the proposed system. The main strategic variances from the baseline model are in the distribution of FTEs for staffing of each position, reduction of redundant tasks assigned to positions, amalgamation of sequential workflow and termination of positions through various and different organizational matrices. The authors made

Table 1. Distribution of FTE's for Team Members in TCPD, Applicant, Meeting and Agencies Matrices

ORGANIZATION	POSITION TITLE IN SIMULATION TOOL	FTE						POSTION ROLE
		TCPD	APPLICANTS	STCM	AGENCIES	TOTAL STAFFING FTE	TOTAL POSITIONS FTE	
APPLICANT	LAND OWNER	0.1	0.1		0.1	0.3	0.3	ST
TCPD	DIRECTOR(D-1)	0.50		0.30	0.20	1.00	1.00	PM
	DEPUTY DIRECTOR (D-2)	0.40	0.1	0.2	0.30	1.00	1.00	SL
	SENIOR TOWN PLANNERS(STPR)	0.40	0.20	0.20	0.20	1.00	1.00	ST
	TOWN PLANNERS (TPR)	0.40	0.20	0.20	0.20	1.00	1.00	ST
	SURVEYORS (SR)	0.50	0.10	0.10	0.10	0.80	1.00	ST
	ARCHITECTS (AR)	0.50	0.10	0.10	0.10	0.80	1.00	ST
	TECHNICAL OFFICERS (TOR)	0.50	0.30	0.20	0.10	1.00	1.00	ST
	ACCOUNTANT (ATR)	0.50	0.20			0.70	0.70	ST
MEETINGS KEY MEMBERS	MAYOR/METRO			0.20	0.20	0.40	0.40	SL
	STCM-CHAIRMAN			0.25	0.25	0.50	0.50	SL
	HYDROR			0.15	0.15	0.30	0.30	ST
	NFSR			0.15	0.15	0.30	0.30	ST
	EPAR			0.15	0.15	0.30	0.30	ST
	ECGR			0.15	0.15	0.30	0.30	ST
	GWCLR			0.15	0.15	0.30	0.30	ST
	MWDR	0.20	0.20	0.15	0.15	0.80	0.80	ST
	MPHDR			0.15	0.15	0.30	0.30	ST
	LCR	0.15	0.10	0.15	0.15	0.60	0.60	ST

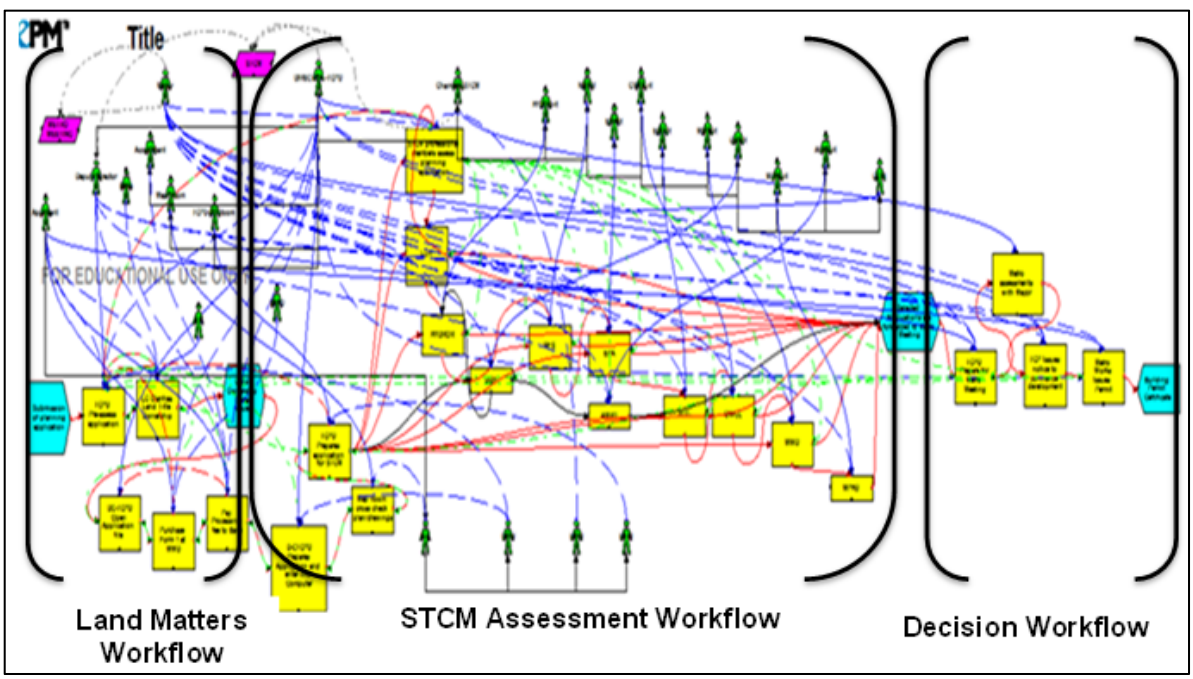

Fig. 3. The Three Sequential Workflow of the Delayed Case Planning Approval Process.

several changes to the professional team members' and organizational attributes parameters to represent the streamlined professional workflow and knowledge flow process as per task interdependence. Three sequential workflows (e.g. land matters, assessment and decision workflow) were amalgamated into a single workflow. Four out of 10 Agencies (e.g. AMR and DUR to MWD, GWCL to HYDRO, and MPHD to EPA) tasks were reassigned to other agencies tactically so the work interdependence and knowledge may flow progressively. The HIGH Formalization and Centralization were changed to MEDIUM (see Table 2); this is to avoid faulty organizational functionalities so that it wouldn't affect the results produced by the ARM case. The study also set several acceptable and unacceptable intervention for the alternative restructured model.

Method of Analysis, Limitation and validation. Over 100 trials were run for each VTD COT simulation ten simulation runs were made (N=1000). The Delayed Case-Baseline and the Alternative Restructure Model-Streamlined cases were compared on selected performance variables at professional / subteam attributes, task assignments, and organizational policy attributes project, and position levels. In so doing, the authors had proposed acceptable and unacceptable interventions in modeling the ARM. Table 3 depicts the acceptable intervention and unacceptable intervention employed in the ARM COT simulation modeling. Unlike other computational simulation experimental researches that were mostly conducted and validated only for an idealized case [18] this study went beyond that by having expert validations to confirm the applicability and adaptability of the model designed [19] of the Model designed. This VDT COT Tool (SimVision® software) has been proven and validated by several students from Stanford [2] & [20] and many more. In the ARM case study, actual expert validation consisting of 16 Members of STCM were asked to offer advice on the results produced by the VDT COT.

Results and Analyses

The VDT COT simulations illustrate that knowledge flow enables workflow. The various agencies member operating in a discontinuous membership who uses their low level of professional skills and yet depend on

Table 2. Alternative Restructured Model (ARM) Experimental Setup

OBJECTIVE	ORGANIZATIONAL ATRIBUTES PARAMETER	RANKING
Using the Organizational attribute parameters to produce best result of project duration in the simulation Models while maintaining important baseline parameters	Centralization	MEDIUM
	Formalization	MEDIUM
	Team Experience	MEDIUM
	Matrix Strength	MEDIUM
	Functional Error Probability	0.05
	Information Exchange Probability	0.7
	Noise Probability	0.2
	Project Error Probability	0.05
	Work Volume per Full Time Equivalent	8 hours/ FTE
VARIABLES	Work Days per Week	5 days/ week
Position's FTE	Agencies, Actors, Positions (16 in total)	Increment of more than 0.5 and up to 1.0
Position	Reassignment non strategic and strategic task (4)	Strategic task
Skill Level	Varies Reassign task and positions	MEDIUM
Synchronization	terminate 7 positions and reassign task	Sequential and concurrent task
Success Probabilities	When the DIO parameters are balanced it will the produce normal project duration	CPM=34.3

Table 3. Acceptable and unacceptable intervention of the ARM-COT VDT

ACCEPTABLE INTERVENTION	UNACCEPTABLE INTERVENTION
▪ Change levels of centralization, formalization, or matrix strength	▪ Adding a new skill to a professional
▪ Reassign tasks to different actors	▪ Changing Functional Error Changing Noise Probability
▪ Delete non-strategic task	▪ Changing Information Exchange
▪ Terminate responsible positions but not the key positions	▪ Changing key activity and task precedence
	▪ Terminate key positions such as STCM Chairman

other agencies team members with higher expertise skill to complete or to supplement their functional skill task, results in approval processing complications. Table 4 presents the comparative results between the current practice and alternative proposal.

The ARM computational simulations demonstrate that the multiple sequential and concurrent workflows have an effect on the members who are continuing the approval processing; that in turn has an effect on the efficiency of the overall approval process. This is because members don't work in isolation but are interdepending on one another, and when the expert member is discontinuous with the expert node it slows down the workflow process. During the process (refer Table 4), there is slight change to the critical path method and communication risk and total work volumes of the Baseline-delayed case. However, the rework volume is reduced (by 161.9 days difference) in the ARM because less professional position team members from TCPD are adhering to exceptions (streamlining measures) that the STCM -members had apportioned to member during the approval processing. The coordination volume shows (see Figure 3 diagram and Table 4) higher in the Baseline

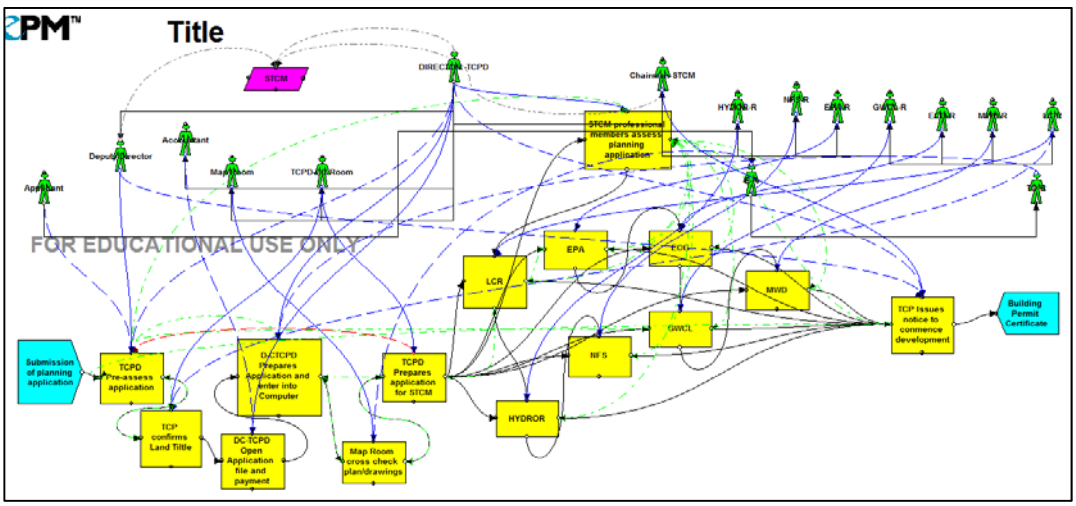

Fig. 4. Screen shot from VDT COT showing Alternative Restructured Model (ARM) layout

Table 4. Comparison of Selected Organizational Performance Measures for the Planning Process Workflow

PERFORMANCE MEASURE	BASELINE (DELAYED CASE)	ALTERNATIVE RESTRUCTURED MODEL(ARM)	PERFORMANCE VARIATIONS
PLANNING APPROVAL PROCESS			
Simulated Duration (days)	161.1	39.7	121.4 days better
Total Volume(days)	1356.9	232.2	232.2 Lesser volume
Total Work Volume (days)	71.9	46.9	25 days lesser Work volume
Rework Volume(days)	169.7	7.8	161.9 days rework difference
Coordination Volume (days)	1042.4	165.3	877.1 Coordination Volume days difference
Decision Wait Volume (days)	45.8	12.2	33.6 decision wait volume difference
PRI	0.45	0.376	FRI difference of 0.074
FRI	0.00	0.403	FRI difference of 0.403
Critical Path Method -days (CPM)	36.4	24.4	CPM difference of 12 days
Communication Risk	0.00	0.50	Communication Risk difference of 0.50
Meeting Risk	0.19	0.30	Communication Risk difference of 11
Coordination Risk	0.063	0.431	Coordination Risk 0.368

case because it is the most professional spent time organizing and consulting one another without doing the main task involved in the process. On the other hand, the wait volume is higher (12.2) in the ARM in considering the simulation duration of 39.7. This is because more exceptions were occurring due to the discontinuous members (reduced position skills from 25 to 15 skill positions). This reduction in the baseline created overload of skill/position in the workflow process hence the increase in the rework volume.

The Planning approval processing project's FRI in ARM was higher than the Baseline. The baseline produced a null value of 0.00 against 0.403 of ARM to Baseline case respectively. The Baseline produced a FRI measure lower than ARM because the skills and position were added to the professional members hence the higher and multiple interdependence defects. The PRI of the baseline and ARM was 0.45 and 0.376 respectively. PRI of the Baseline was slightly higher with a difference of 0.074 points than the ARM. The ARM solution found, which was 121.4 days better than the baseline, was relatively better. This offers a clue (solutions) from the baseline to the ARM.

CONCLUSIONS

This paper demonstrated how knowledge flow enables workflow by using the VDT COT tool to understand how the discontinuous member's involvement due to the multiple task interdependence affects the overall approval processing. The study establishes that a member agency operating as a discontinuous membership who uses their low level of professional skills and yet depend on other agencies team members with higher expertise skill to complete or to supplement their functional skill task, results to approval processing complications which is very risky and in turn causes approval processing delays. It illustrates the need to consider explicitness of knowledge as part of organization contingence factors for better accuracy in predicting organizational workflow performance. This paper describes how recent study further validates the earlier study by [1] finding that discontinuous members leave the workflow process with some amount of expertise knowledge, whereas the continuing members suffer knowledge regressions. It extends the VDT COT tool by integrating exception handling through emerging three sequential workflows and reassigning concurrent task networks among teams, while establishing how knowledge regressions affect workflow process when the organization team members are operating within multiple sequential and concurrent and having multiple task interdependence among discontinuous membership.

Here, this paper would like to highlight two critical theoretical situations as per illustrated by the Accra case study. They are 1) the active ontological knowledge flows among the individuals to the organizational set up, and 2) the discontinuous membership breakups during the development process for a project to allow smooth knowledge flows among key stakeholders during the complex process. The Discontinuity in Organizations (D-I-O) theory is elaborated by [4] who explained the four dynamic operating characteristics which-when combined and not well-mitigated-could lead towards organizational performance failures hence the projects' socio-economic failures in providing adequate housing to the masses. There is a need for awareness and understanding of the multiple organizations involvement, the mixture of sequential and concurrent workflows, high interdependent tasks, and regressive nature of tacit knowledge throughout the different phases of an urban project's lifecycle development process.

In lieu of the above situation, the study puts several recommendations that it believes could help mitigate the debilitating impasses which would eventually cause devastating consequences later in succeeding phases. To support and plan restructuring of a city's planning process, the paper would like to recommend future actions to include: 1) Review current land and development legislations for the locality; 2) Utilization of ethnography technique for documenting the organizational structure and process workflow and allow deeper understanding of the socialization activities [21] in order to obtain accurate interpretations of stakeholders' behaviours; 3) Usage of computational simulation tools to study the risks and benefits of restructuring organizations for achieving targeted goals; and 4) Reference to computational scenarios when designing to seek alternative planning process restructuring.

In conclusion, this paper contributes in recommending further applications of the D-I-O theory [1] and [4] to improve dynamic flows yet mitigating the knowledge-loss phenomenon in the property development lifecycle.

It improves [16] information processing theory by allowing horizontal knowledge flows in project teams for effective collaborative outcomes. By addressing the issues mentioned in the paper, city authority could promote sustainable socio-cultural factors to achieve economic benefits in maintaining a sustainable urban development.

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