Service Optimization Using Goal-Oriented Modelling in Judicial Domain

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Abstract: The purpose of this research paper is to identify and evaluate the obstacles of service delivery within in judicial domain and examine to what extent it can be improved. This report covers the evaluation of the current service delivery process within judicial domain and identifies the limitation with them. Besides that, it purposes an improved framework to optimize the services within judicial domain. Similarly, *i** modelling frame work is used to identify the relationship between various key actors and the responsibilities between them to enhance the service delivery. Furthermore, it aims to implement the recommended model in the real service operation within judicial domain and evaluate the result. It then discussed about the possibilities of use of ICT within judicial domain to improve the service delivery. The impacts of poor resource allocation and the cost measurement of ac-tors are also discussed in this report. This study recommends conducting additional assessment to implementation of service optimization process within judicial domain. To conclude, this research paper proposes a way to organize services within judicial domain based on findings which assists judicial domain to provide effective and efficient service delivery to serve the community.

Key words: Judicial service domain, service delivery framework, business processes, organizational modeling.

1. Introduction

Judicial domain is an association where various services are provided in related to judiciary. Moreover, judicial domain is one of the most important sectors for society where judgments are made based on various evidence provided. A significant number of judicial domains is affected by the poor management in the service delivery operation and continuous use of a designated faulty framework in the service of judicial system. Most of the time, participants who are involved in the judicial system, they must go with many procedures while providing or receiving the services which include sharing legal and relevant information either as a hard or soft copy. This process sometimes takes enormous time to be completed, it means, exchanging information is often required in the judicial system and it should be swift and easy. Similarly, the number of pending cases in Europe is gradually increasing and if the problems in current system are not mitigate, millions of cases will be pending [1]. Mostly, the reason behind poor service delivery in the traditional system is lack of effective and efficient management of the human resource, technology and the required processes. Apart from technologically advanced countries, there are still some countries that uses manual process while handling documents and mailing is a primary medium of

communication which causing delays to the court proceeding.

This study identifies the issues in the current judicial system regarding service delivery and introduces the possible way of optimizing services within judicial domain. This solution encourages service providers to use ICT in the service delivery operation. Furthermore, the relationship between key actors and their responsibilities are identified in this report and suggestion is made to the actors to be more responsible with their responsibilities. Eventually, it will speed up service delivery and improves the business and operational processes.

2. Background

2.1. Organizational Modelling Languages

The resources such as human resources, various processes and the technological resources are the main elements that impact the service delivery within judicial domain. It is logically true that every resource depends over other resources within judicial system in a various way to achieve business goals. So, there are various organizational modelling languages are available which could assist to improve the organization's business communication, resource allocation and duties by using its framework. The organizational modelling languages such as the Activity Based Management (ABM), Unified Modelling Language (UML) and Entity Relationship Model (ERP) define the business process in a different context. Besides that, organizational modelling notation such as business process modelling notation (BPMN) and *i** modelling framework are available to design the service delivery framework in an organization. Business process modelling supports business processes in the organization using its unique techniques and software to analyse overall business operation where various resources can be represented such as humans, application, documents and other sources of information [2]. On the other hand, the goal-oriented requirement language based *i** modelling framework is common modelling that uses the user requirements notation.

2.2. *i** Modelling Framework

i* modelling framework always represent the business structure of the organization with help of its basic notation. Basically, it has three fundamental concepts to represent business process which are relationship, objects and dependencies. In the context of relationship in this framework, it is denoted by various links such as contribution link, decomposition link and means-end link. Contribution link is used to show the impacts of the specific task on a soft goal whereas decomposition link is used to show the relationship between subtasks and task. Similarly, means-end link is used to depicts the contribution for a goal. An object in this framework refers to the actor which is graphically represented; an object can be stakeholder, the business goals, business activities, soft goal, task, and resources [3]. The dependency between various actors in this framework defines the responsibilities of a depender and dependee through strategic dependency which called dependum [3].

i* modelling consists with two different approaches which are strategic dependency and strategic Rational model. A strategic dependency (SD) model contains various nodes and link to represent the relationship between key stakeholders of an organization. The Nodes represents the actor and links represents relationship between them [4]. The actors involved in the judiciary system have already been identified and the strategic dependency model will help to represents the dependencies and relationship between actors with the goal and task based on their characteristics. The below diagrams show the Strategic dependency between various actors in the judiciary system.
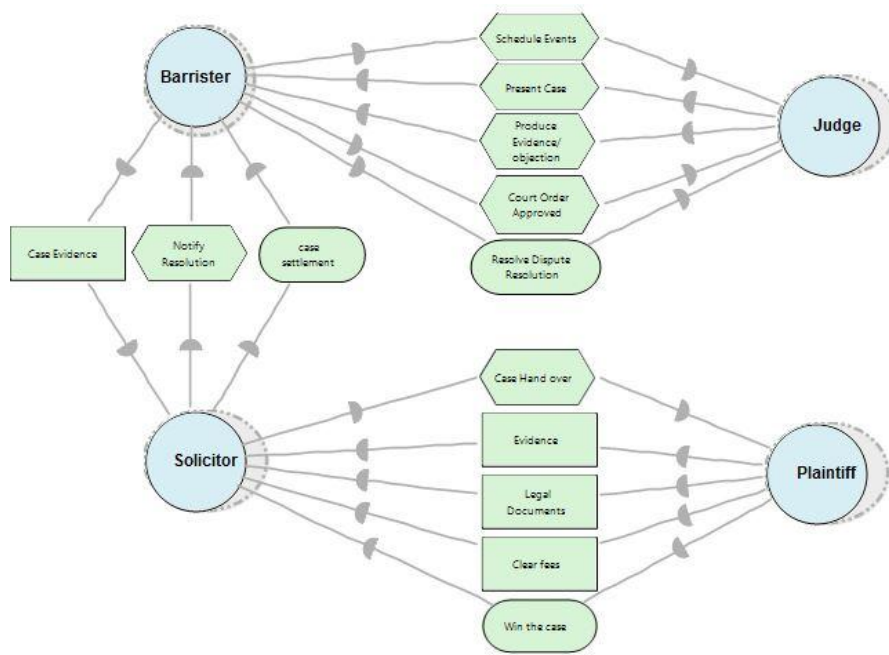
Fig. 1. Strategic dependency between solicitor, plaintiff, barrister and judge.
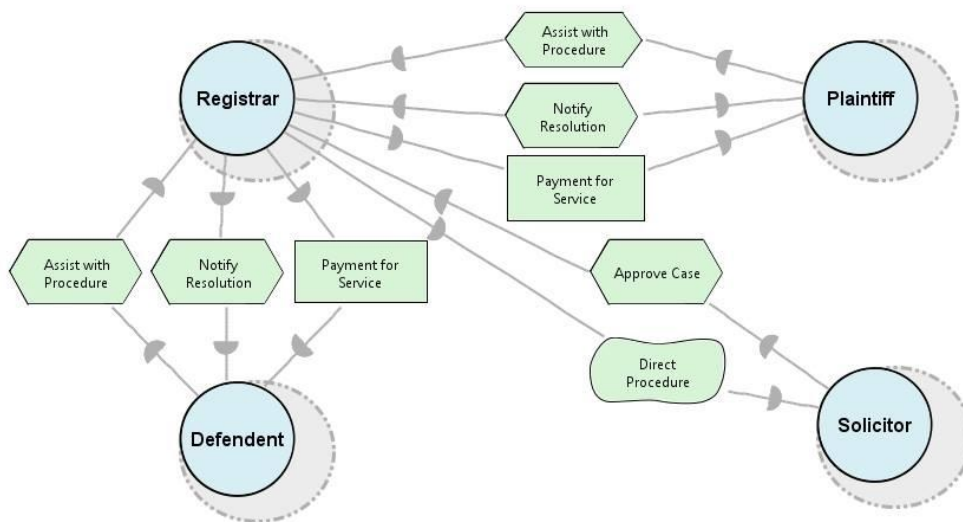

Fig. 2. Strategy dependency between registrar, solicitor, plaintiff and defendant.

The Fig. 2 shows the strategy dependency between Barrister, judge, Solicitor and plaintiff whereas Fig. 3 shows the relationship and dependency between Registrar, plaintiff, defendant and solicitor. These are the key actors of the judicial domain and the relationship and dependency of these actors defines how the service is delivering in the organization.

2.3. Process Efficiency Issues in Judicial Domain

The internal management plays a vital role while it comes to provide efficient services so that it is most important to keep in mind that there should be satisfactory human resources and ICTs are available. Currently, the judicial system in the Republic of Moldova is facing the problems of workloads of the judges in the different courts whereas unmanaged allocation of the judges and other staffs has made their judicial system faced service delays [5]. Another issue is case complexity and its pro-cessing time, service delay can be occurred if the case is complex which takes a long time to be disposed of. Moreover, the dependencies

between actors and co-actors and case load in court also are the problem. One of the main reasons behind service delayed in the judicial system is transferring legal documents from one court to an-other [6]. In addition to that, there are risks of managerialism within the judicial do-main, particularly, in the case of judges and the court administrative who have taken responsibilities of running the system [7].

Number of civil, commercial, administrative and other pending cases(*) (first instance / per 100 inhabitants)

2010   2012   2013   2014

Source: CEPEJ study

(*) Comparisons should be drawn with care as some Member States reported changes in the methodology for data collection or categorisation (CZ, EE, IT, CY, LV, HU, RO, SI, FI). CZ and SK report it is not possible to single out the number of pending cases at first instance, as cases are considered pending until no further proceeding is possible. ES: Changes in incoming cases reportedly explain variations. PT: Data were not available due to technical constraints.
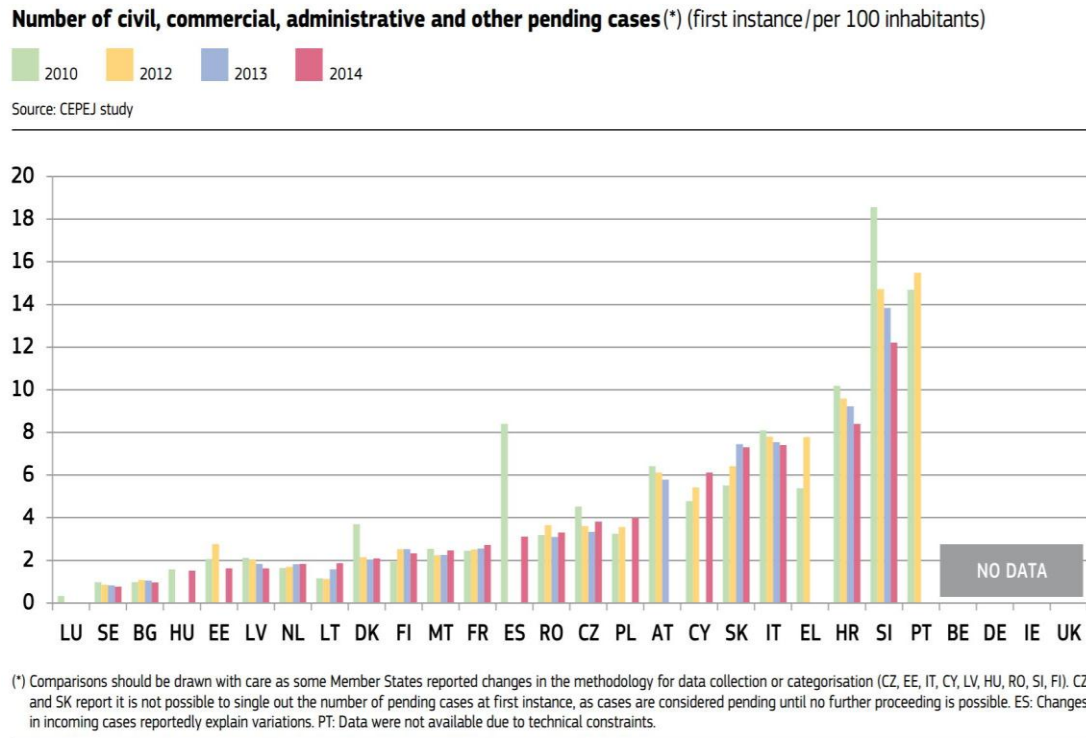
Fig. 3. The pending cases in different countries in 4 different years [1].

The case processing is one of the most frequent task that circulates in the judicial domain. There are significant number of elements in the court that creates obstacle while delivering service in the judicial domain. The elements such as case complexity, case load, case events and structural incentives and facilitation affects the overall service delivery within judicial domain [8].

Case Complexity: Some cases are admittedly difficult to measure, they simply more complex and more time-observing when compare to others. One of the dimensions to measure complexity is the number of defendants in the case. The multiple number defendants in the same case create more problems in scheduling and coordination and complicate plea bargaining.

Case Load: Case load is another example that hamper the service delivery process within judicial domain. When a variable number of cases compete over limited re-sources of service delivery operation, the result always be the longer case processing time. The case load is divided into two, one is court case load and another is individual case load. Court case can be measured by what's in the central docket of the court system for the assigned judges which means the relevant caseload is the number of cases per judge. Eventually, this effect whole court system either positive by overwhelming resources available or negative by comparatively faster processing as caseload rises. While, talking about individual caseload, it refers to the case load that the judge handling which basically represents the negative effects.

Case Events: when the case is unfolded, the participant often takes some actions which is either they curtail the case or prolong the processing time. Such case events can be as early dismissal, trail, pretrial motion, defendant absence and psychiatric hiatus Trail basically contrast the most time-consuming disposition whereas pretrial motion refers to the hearing and preparing the discovery to suppress the

evidence. Sometime defendant fails to appear in the court which also cause services delay with-in judicial domain.

Case Specific Incentives: Case processing time varies from case to case, from court to court and structural and administrative arrangements. Processing time depends on variables that introduce various mixes of incentive for defendants and judicial workers. Most of the times, retained attorneys handle cases more slowly than public de-fenders because of indiscreet payments by the client. Jailed defendants have more incentive to advance his case swiftly and same pressure raises for judges and prosecutors to trial the case to avoid presumptively innocent defendants to be detained for a long time and to avoid overcrowding jail space hence reducing processing time.

2.4. Potential for Process Efficiency

Issues regarding process efficiency within judicial domain have been increasing day by day. It is most important to overcome those issues so that better service can be delivered in the organization. The differentiated case management can be implemented within the judicial system [6]. it groups the case disposition based on what needed to be disposed and required action will be take place with fairly and timely manner. Furthermore, making hearing and trial dates with appropriate policy encourages litigants to prepare themselves on fully manner for trail when the case can-not be solved without trail. Similarly, the crash program is designed to reduce the case delay within judicial domain. this program allows to add the visiting judges, monitoring judge's bench time and instituted meetings among prosecutors, judges, project staff, police, and sheriffs. The visitor judges would decrease the case load per judge whereas monitoring judge bench always analyse the working flow and rewards hard worker and penalized shirkers [8]. Additionally, Operating branches in different cities would reduce the case pending and work load and customer will be able to get fast and efficient services [5]. In addition to that Reallocating judges based upon the workload of the courts allow management to use balance resources wherever required.
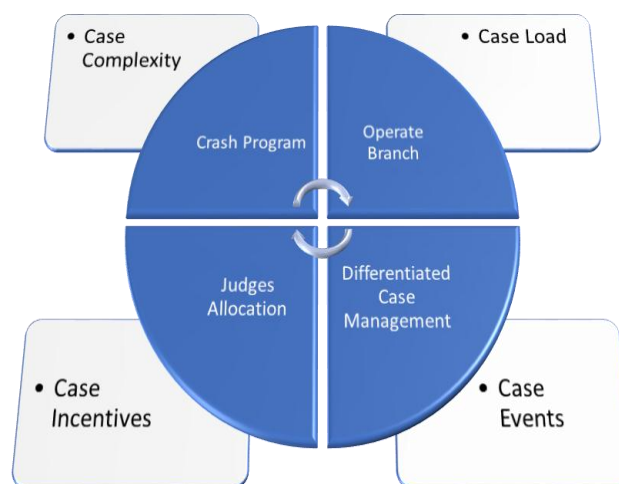

Figure 4 Issues and solution of the judicial domain

3. Methodology

This section covers different phases that are required to measure the service delivery within judicial domain using goal-oriented modelling. Firstly, Strategy Dependent modelling is presented to measure the

organizational effectives in the judicial do-main. Secondly, research analysis will be done in different parameters such as frequency of the actor, criticality, vulnerability and time and cost of different actors. Finally, the outcomes are analyzed and enhancement regarding judicial domain is presented.

3.1. Assessment of the Organization Model

The organization such as judicial domain has various human resources are involved in the process of service delivery and those human resources are denoted by actor in the *i** modelling framework. *i** modelling consists with different notation such as actor, task, goal, soft goal, resources, etc. [9]. The different actors are identified in the context to judicial domain and each actor have different actions plan to achieve their different goal. A task represents the activity that is required to complete by the actors whereas goal is the main aim of the communication of two actors. Similarly, Resources are the information that is required to support a goal.

The identified nine different actors are Plaintiff, Defendant, Police, Judge, Barrister, Bench Clerk, Court Clerk, Registrar and Solicitor. Plaintiff is the person who initiates the case whereas defendant is the person that plaintiff file the case against [10]. Judges hears the case and make the final decision based on evidence provided. Similarly, Solicitor is known as lawyer who holds the legally required qualification to practice law in court. The registrar is a manager who assists at the court. The court clerk is the person who handles the legal documents within judicial domain and Bench clerk is responsible for announcing the cases and calling participants in the court.

The above-mentioned actors communicate with each other in dependency relation-ship within judiciary domain. The Strategic Dependency Model below represents relationship and their dependency between nine actors in the judicial system.
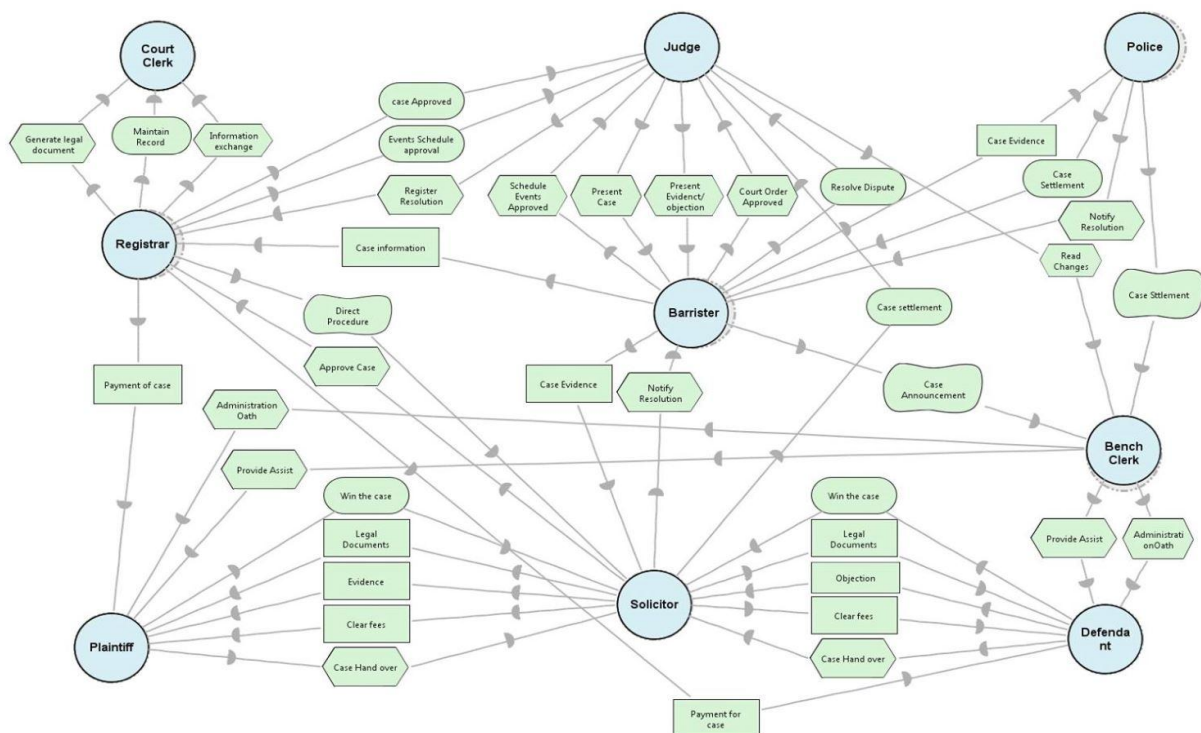

Fig. 5. Strategic dependency model.

3.2. Assessment of Key Parameters in the Judicial Service Domain

Problem boundaries focused on actor's roles are implemented by the notation of *i** modeling framework

and can be defined by identification of service areas and evaluation of various factors in the problem domain which is the essential aspect of organizational modeling. Illustration through an explanation of the dependency relationships among the actors achieved with the use of developed Strategic Dependency (SD) model is the main service delivery processes in the judicial service domain. Vulnerability, criticality and time are the parameters which are identified from the perspective of actor i.e. the Solicitor, the Barrister, the Judge, the Registrar, the Court Clerk and the Bench Clerk, are assessed based on their dependencies in the SD mod-el. Actors other than a business unit of judiciary such as the defendant, the Plaintiff, and the Police are represented in this model to demonstrate their dependencies as they contribute to the implementation of the business process.

3.3. Measuring the Vulnerability of Actors

The vulnerability always refers to the threats that could affect the business process in negative manner within the judicial domain. when it comes to the *i** modelling, the vulnerability of actors helps to identify and measure the risk associated with business process. The intention of the depender is to enable contribution to dependee for dependum to achieve the goal, task and make resource available [11]. Failure to achieve dependum will affect the whole process by making it more vulnerable and the chance of risk occurrence will be high.

To measure the vulnerability of the actors, matric is used which is based on the developed strategic dependency (SD) model for the judicial domain. It uses the basic formula, division of number of outgoing dependencies by the number of dependee [11]. Simply, there will be higher chance of vulnerability occurrence when more dependencies are outgoing and the less number of dependee is available. Similarly, the less dependencies outgoing and more dependee are available ensures the lower chance of vulnerability occurrence. The reason behind this is each outgoing dependency have different goals, resources and task assigned and failure to satisfy dependencies leads to increment of the risk. The Metric below depicts the measurement of the actor vulnerability. Here,

Vulnerability Measurement (VM) = Number of outgoing dependencies / Number of dependee
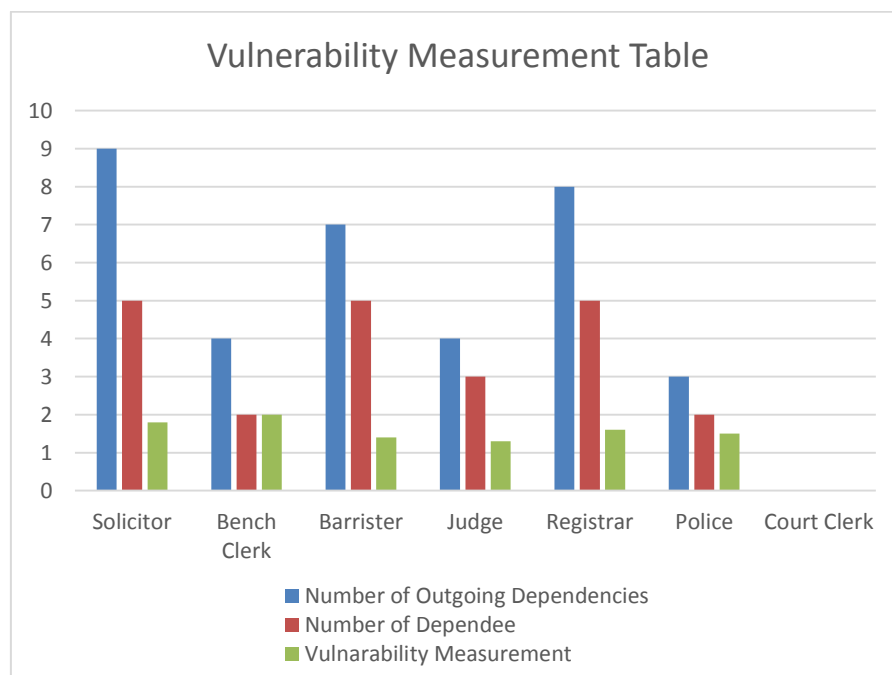

Fig. 6. Bar chart of actor's vulnerability measurement.

3.4.   Measuring the criticality of Actors

Measuring Criticality is another technique of identifying problem associated with the business process within a judicial domain. Basically, it measures the status of the actor's performance based on the incoming dependencies, as a result it affects the whole business processes. Strategic Dependency model of *i** framework allows criticality to be analyzed which helps to mitigate the risk of judicial domain [11].

Criticality occurs when actors have more incoming dependencies which is measured based on developed Strategic Dependency (SD) model of the judicial domain. To measure the criticality, the formula is used, which is multiplying the total number of incoming dependencies by the total numbers of dependers. The status of the criticality is measured by the higher number of criticality, the higher chance of risk occurrence. the reason behind this is the incoming dependencies of the depender which has various goals, task and resources need to be done and failure to do so results leads to increase the risk associated with business process of the organization. Thus, to reduce the chance of risk occurrence, it is most important that the actors have lower incoming dependencies or lower number of depender [11]. The diagram below describes the criticality of the actors based on SD model.

Criticality Measurement = Number of incoming dependencies * Number of depender
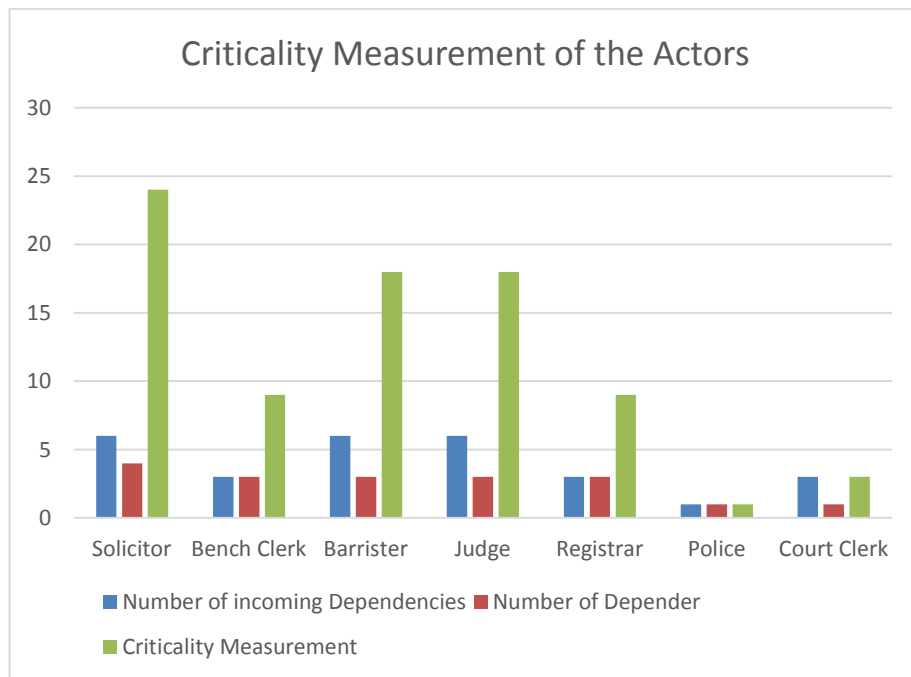

Fig. 7. Criticality measurement of the actors.

3.5.   Impacts of Time Taken by Actors in the Business Process

It is assumed faster decision making improves the business process efficiencies within organization. On top of that an excellent way of communication and reducing the time taking in the process constantly provide the better service. The communication plays vital role in the organization but it is not that easy to manage as there are various types of communication are being used and different actors are involved in it which makes it more complex. Similarly, sharing timely and accurate information amongst actors brings the success in terms of business process [12], [13]. Therefore, it is most important to measure the time of actors and the obstacles that affecting the communication so that communications between actors should be more effective. Moreover, the most crucial elements of communication are time and cost so the result of better communication always relies on how these two elements are being considered. The poor

management of these elements leads to inadequate, unreliable and insufficient information which ultimately affects in the business process of the judicial domain [12].

3.6. Organizational Structures

Organizational structures are the other factors that could influence the case duration in the judicial domain. The organizational structures should be analyzed of the judicial domain to identify how court structures are organized, how the court has man-aged the cases and the time of judges utilized. There are various factors within judicial domain such as Decision-making requirements, judicial specialization, and judicial training and competence which affects the service delivery within judicial do-main [14]. Decision making is the key elements in the service operation, using the multi judge benches, the shared resources can be used which ultimately allow re-sources to be more utilized. The use of specialized courts and judges impacts the overall process in the judicial domain. it allows resources to be used in an effective way which allows judicial expertise to increase the speed, volume and efficiency of dispute resolution. For example, divorce litigation is the fastest compare to other cases because judges primarily handle contested divorce trials, leaving other work to quasi-judicial staff. Similarly, judicial training and competence is also a major element. It defines the age and experience of the judges, the more experienced in the judicial service delivery or better trained judges could provide the better services including decision making more swiftly [14].

3.7. Human Resource

Judicial resources play vital role in terms of delivering services within judicial domain. It seems that increasing the number of judges and courtrooms could provide faster service delivery in the organization. However, this is not always applicable when there are financial issues in the organization. The number of judges, the availability of the courts and allocation of judicial resources defines the quality of the service which has been delivered in the judicial domain [14]. The availability of the human resources and proper allocation of them is the most important tasks in terms managing the judicial domain, failed to manage could affects negatively in the capacity of courts to process disputes. Furthermore, one of the reasons behind poor service delivery is unavailability of the court's room for hearing which lead the trail process to be ex-tended [14]. As result, there will be obstacles which need to be analyzed and investment is required to mitigate those issues so that better service delivery can be provided to the participants.

4. Analysis and Proposed Enhancement

The above SD model represents the different actors, relationship, responsibilities and dependencies between them within judicial domain. The communication and various activities that carry out between deependers and deependees in the judicial service are shown in the SD model. Moreover, the dependencies shown in SD model are goal oriented which assist to provide the business services in the organization. The actors such as Solicitor, Barrister and Judge have higher number of dependencies which makes them the important business unit in the judicial domain. Similarly, the actors such as court clerk, police, and bench clerk have the lowest number of dependencies. As the dependencies of the actors in the SD model are not the proper way to analyze the effectiveness and efficiency of Actors, different parameters were used such as measuring vulnerability and criticality of the actors.

In Fig. 7, the bar chart shows solicitors have the highest number of outgoing dependencies and dependee, 9 and 5 respectively. However, the bench clerk has the higher vulnerability measurement, so risk occurrence chance is higher with the bench clerk. As a result, service delivery can be affected from the bench clerk's position. Similarly, in Fig. 8, it can be clearly seen that the solicitor is the most critical actor whose critical measurement value is 24 with 6 incoming dependencies and 4 dependers actors. Therefore, it is most

important to reduce the criticality of this actor to in-crease the work efficiency within the judicial domain. Additionally, judge is the second most critical actor followed by bench clerk and registrar with the critical measurement value 18, 9, 9 respectively. These actors are the main business unit within the judicial domain, so it is most important to decrease the criticality measurement of these actors by reducing the number of incoming dependencies and dependers.

The higher chance of vulnerability occurrence was Bench Clerk with 2.0 value and this risk is mitigated by increasing the dependee of the actor. Bench clerk now direct the barrister to present the witness in designated area. Similarly, reducing the number of incoming dependencies for solicitor can decrease the chance of risk occurrence in the process of service delivery by the solicitor. This proposed framework will mitigate the issues regarding the mentioned issues and enhanced the service delivery within judicial domain. In order to optimize the service within judicial domain the SD model is proposed.
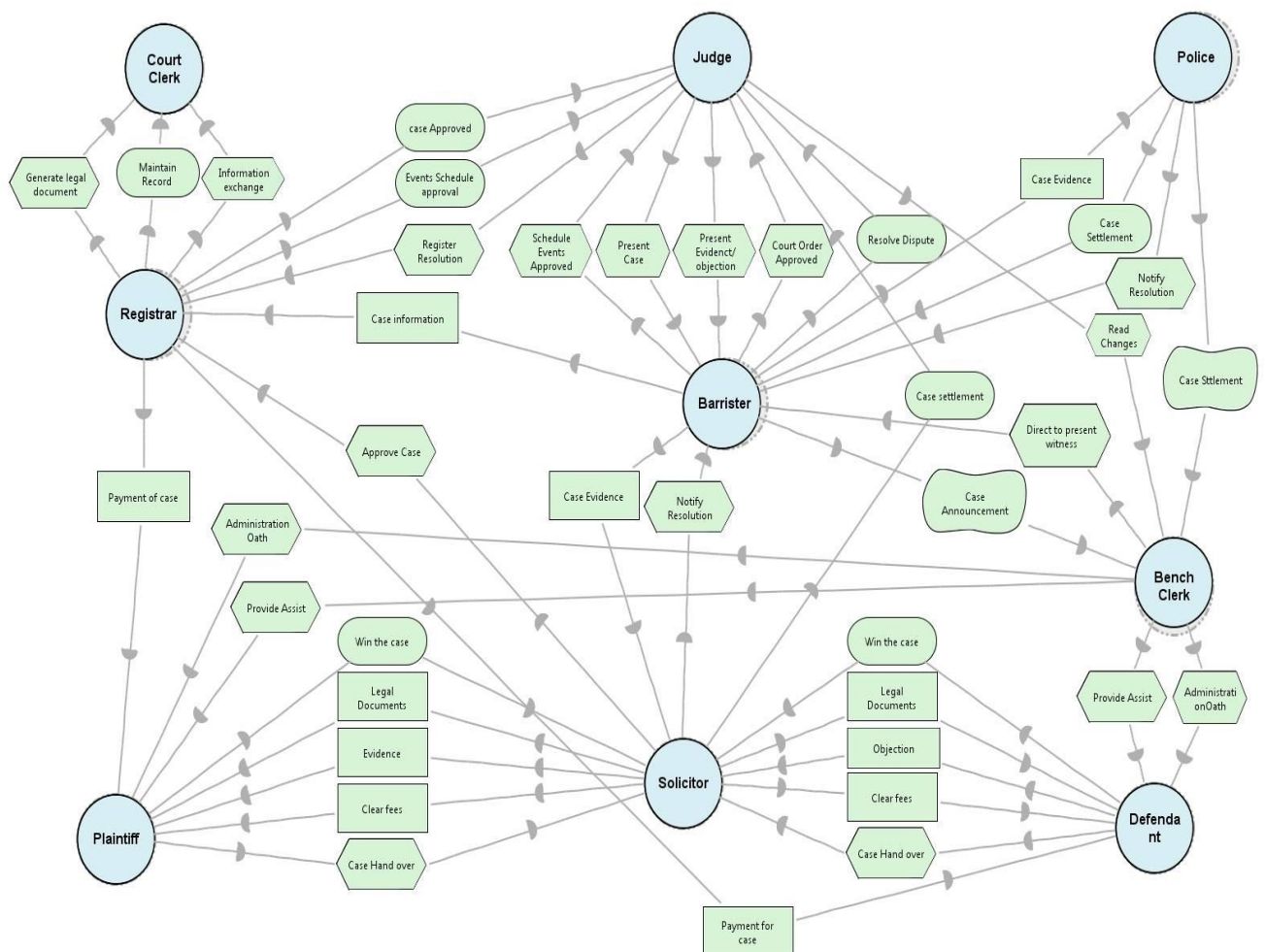

Fig. 8. The proposed strategic dependency model of the judicial domain.

Increasing service efficiency has always been a challenge for the stakeholders of the organization. The proposed SD model using *i** modelling framework is believed to be a liberator of the bad experience of service delivery within judicial domain. The improved version of the SD model accelerates the services and provides appropriate resource allocation within judicial domain. Different parameters were used to identify the risk occurrence and critical actors by the measurement of those parameters and based on the result, the model was proposed to mitigate those issues and provide the service improvement within the organization.

The proposed model has lower vulnerability and criticality measurement value which ensures the better service within judicial domain [15], [16].

A business service improvement is the key to enhance the customer interaction and meet the organization's goal. The organizational modelling ensures the service delivery is effective and efficient in relation to the business process. Certain positive changes in the internal functional process make the service swift, on top of that, it increases the productivity of the internal and external actors. It is most important that main business unit such as judge, solicitor, registrar, bench clerk and court clerk have job satisfaction which ultimately other actors such as defendant and plaintiff can have service satisfaction. Change process is always required to improve the services so when change in process occurred, the various elements such as goals, tasks, resources and other activities are positively affected. As a result, customer satisfaction can be gained.

Furthermore, effective communication can improve the service delivery in the judicial domain by using Information and Communication Technology. In Judicial system, people have found a conflicting relationship between the functionality of the technology and logical bases of the law. However, the result has shown significant benefits in the use of technology in terms of providing service. Technology has been favored us in many ways to complete the various task in efficient manner in the organization. This has now come to the service of justice where its role in judicial system is becoming more popular these days. Technology has been playing very important role to enhance the physical accessibility of the courts, sharing resources within judicial domain and efficient communication between various actors and distribution of the information while saving time, labor, transportation and other service delivery related cost.

5. Conclusion

Judiciary system is the governmental organ of a country that interprets the law and provides a mechanism for dispute resolution. Smooth operation of judiciary body helps to elevate other parts of the country's operational body. So, it is essential to remove any issues in the conventional judiciary system especially prevailed in developing countries. This can be done by improving the delivery process of service within the judiciary. There are various organizational modeling languages within the judicial service domain. *i** modeling framework is selected service delivery framework for the development of service delivery framework. Under this framework, to measure ac-tors' vulnerability and criticality, dependency relationships between different actors are considered. Parameters such as frequency, time and cost were also accessed in the study which is the preliminary criterion in the business framework of the judicial system. Access of digital transformation is spotted as an efficient and suitable blue-print for improvement of the service delivery framework within the domain of judicial service.

Designing business process in the judiciary system of country hugely affects its citizen. Job profiles of actors vary among countries and their functions and job responsibilities are very specific. It is necessary to study actor's goals, their activities, and tasks in larger dimension to reduce the vulnerability of other actors of judiciary system such as Barrister, the judge, and the Registrar. Execution of improvements for service delivery framework must be done carefully as data and information used in the judiciary system are delicate and highly confidential. Proposed solution for future works needs to be integrated as this will further enhance the service delivery frame-work in the judiciary system. People focused delivery of service is a key pillar of the judicial framework. Improving citizens' lives is important agenda of any country and this can be efficiently done through judicial system by implementation of enhanced service delivery framework. This implementation within the

developing countries helps to improve many aspects of citizens' lives and helps to develop its prosperity.

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