

# E-trademark registration services to improve process performance and prevent trademark infringement

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**Abstract.** Building intangible assets, such as trademarks as brand equities, is essential for globally competitive enterprises. This research deploys formal business process modeling and analysis to discover the processes, data, costs, and the players involved in registering a trademark for a country of origin. The research will model the “as-is” and “to-be” trademark registration services. Simulation of the processes enable the construction of an e-trademark service platform, which increases the efficiency and transparency of entire TM services. Once the TM registering processes are documented, the process can be extended to include a full spectrum of smart TM services, such as TM search and analysis to prevent infringement, parallel importation, and illegal branding. The research designs the e-TM registration process in the country of origin and filing for global trademarks under the Madrid system. The e-TM registration process adds value and reduces the manpower required to register trademarks. Finally, a comparative analysis of the as-is (manual TM) and to-be (e-TM) processes provides quantitative measures of the improvements in e-TM service performance. The data models enable the removal of bottlenecks and identify the limitations to protect manufacturers’ intangible assets (brand equity), which guarantees genuine products and services for global consumers. **Keywords.** Intangible asset management, Text mining, Trademark registration, E-service platform, E-discovery

## Introduction

The importance of Trademark registration is increasing because of the global access to products and services. In order for enterprises to maintain a competitive and

sustainable advantage, build brand equity, secure consumer trust, a trademark is an essential intangible asset. Enterprises use their trademarks to guarantee genuine products and services that are not counterfeits or imitations of the brands they trust. The trademark serves as an agreement between the seller and the buyer that the mark seals and certifies the extended product as something more than a commodity. The means by which an enterprise registers the trademark, develops the trademark, protects the trademark, and protects the consumer's interests builds goodwill and significant brand equity. The power and value of the trademark unfortunately tempts others to imitate and infringe on the rights of the owner. The ease upon which a trademark may be duplicated through counterfeiting and imitation, the production of deceptively similar products with names that mislead the consumer has become a global concern. The use of the Internet has drastically changed the channels of distribution of goods on a global scale. Thus, companies must protect their markets by vigilantly monitoring and taking legal enforcement actions against infringing marks.

Registration of a trademark is a systematic procedure that is controlled by a Country. Countries, in turn, enter into treaties (such as the Madrid treaty) to allow the uniform and simultaneous registration of global trademarks. The first country which grants the trademark is known as the country of origin. Once the mark is registered in a country, the Madrid system may be used by member countries to simultaneously register trademarks among global participating member countries. Countries that are not members of the Madrid system require separate review and registration of marks within their country. Since the process for registering trademarks is often misunderstood even by large firms, the goal of this research is to use business process analysis to diagram the objects, processes, costs, and the players involved in registering a trademark in a country of origin. The second step of the process analysis will be to describe the processes for extending the reach of the trademark to the global marketplace. This research will use the business process models to create an e-trademark platform to improve the process flow of registering a trademark in a country of origin and globally expanding the protective reach of the mark using the Madrid system.

## **1. Literature Review**

### *1.1 Trademark*

Trademarks create a company's brand identity, a means to show who you are as a company and the unique products and services that you offer to customers. The user can generalize a trademark and use it to promote goods and services without registering it, but only legally registered trademarks can carry the ® symbol. The study generalizes the process of trademark registration by the government of Australia IP website which includes patents, trademarks and plant breeder's rights. According to the IPAustralia website, there are many types of trademark's including signatures, words, phrases, sounds, movement, letters, numbers, logos, pictures, aspect of packaging or any combination of the above.

The process for trademark registration is shown in Figure 1. First, applicants lodge a request using in the approved form and the IPAustralia office checks that the application is in compliance with the Trade Marks Act 1995. Then, applicants have to file response to the report and to present their case before the Registrar of trademarks, after these actions registrar may reject the application if it fails to meet the requirements. Once the

application not be rejected, after reconsideration, applicant will receive the notice of acceptance and notice of advertisement of acceptance to be made in local dailies and Government Gazette. If there are any person oppose the application and file an Opposition within 3 months, it will hearing by registrar and application can be refuse by registrar; otherwise, certification of registration is issued for a period of 14 years and needs to be renew after 14 years.

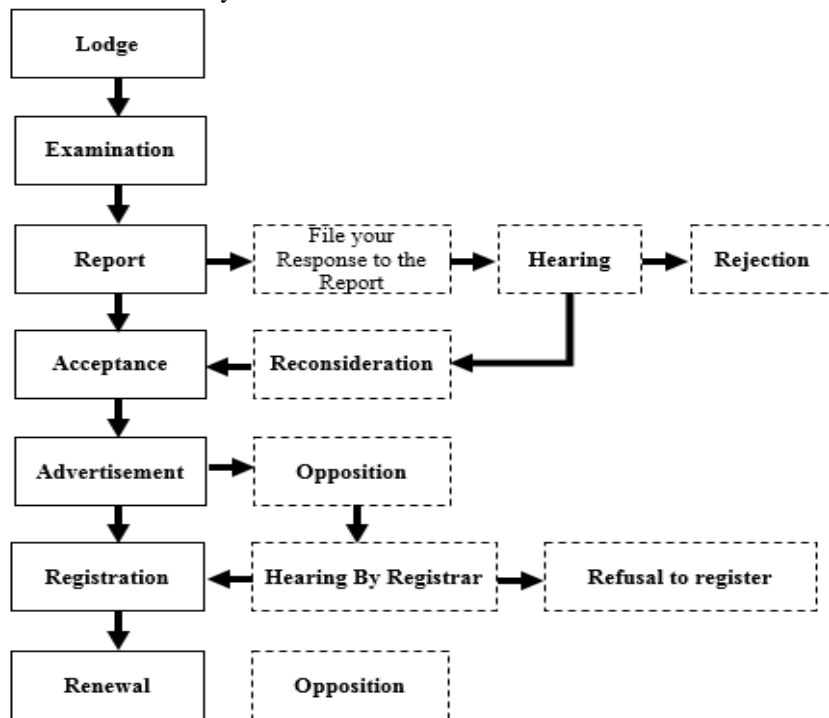


Figure 1. Trademark registration process

## 1.2 Web Mining

Web mining can be broadly defined as the discovery and analysis of useful information from the World Wide Web. This describes the automatic search of information resources available on-line, i.e. Web content mining, and the discovery of user access patterns from Web servers, i.e., Web usage mining.[1]The techniques used for mining structured data are Web Crawler, Wrapper Generation, Page content Mining.[2]

- Web Crawler

There are two types of Web Crawler which are called as External and Internal Web crawler. Crawlers are computer programs that traverse the hypertext structure in the web. External Crawler crawls through the unknown website. Internal crawler crawls through internal pages of the website which are returned by the external crawler.

- Wrapper Generation

In Wrapper Generation, it provides information on the capability of sources. Web pages are already ranked by traditional search engines. According to the query web pages are retrieved by using the value of page rank. The sources are what query they will answer and the output types. The wrappers will also provide a variety of Meta information. E.g. Domains, statistics, index look up about the sources

- **Page Content Mining**

Page Content Mining is structured data extraction technique which works on the pages ranked by traditional search engines. By comparing page Content rank it classifies the pages [18].

In the study, we will use web mining technique which includes text mining and image mining to search for cases of trademark infringement and parallel importation continuously. With automatic search mechanisms, it can replace current manual search way to help trademark infringement searching more efficiency.

## **2. Method**

The purpose of this paper is improving and rebuilding process of constructing trademark for registration service E-Platform, which could provide more efficient service to client than current. In the beginning, the paper surveys information of trademark and collects infringement searching time data for building as-is and to be Petri network model. Then simulate both model and get data of simulation to compare result between these two models. Finally, analyzed result can provide some suggestion for building E-platform.

### **Step 1: Collect trademark registration information**

According to specify country the user belongs to, the study will use correspond registration process and adjust the details as appropriate.

### **Step 2: Collect trademark infringement searching time data in automatic mechanism**

In the study, it will construct automatic mechanism on the platform for trademark infringement searching. Collecting data of searching time in the software and data analysis can provide well-founded searching time for building To-be model in next step.

### **Step 3: Build as-is and to-be Petri network model**

Petri nets are a graphical and mathematical modeling tool which widely apply to many systems (TADA0, MURATA, 1989). The Petri net is a promising tool for describing information processing systems and can be used as a visual communication aid similar to flow charts, block diagrams, and network. In addition, tokens are used in these nets to simulate the dynamic and concurrent activities of systems [1].

Petri nets are a well-found process modeling technique that have formal semantics. (Aalst, 1999) A Petri net is a directed, connected, and bipartite graph in which each node is either a place or a transition. When there is at least one token in any place connected to a transition, then the study will say that the transition is enabled. Any enabled transition may fire removing one token from every input place (Murata 1989, Reisig 1985, Peterson 1981).

A Petri net is a 5-tuple,  $PN = (P, T, F, W, MO)$  where:  $P = \{p_1, p_2, \dots, p_m\}$  is a finite set of places,  $T = \{t_1, t_2, \dots, t_m\}$  is a finite set of transitions,  $F \subset (P \times T) \cup (T \times P)$

is a set of arcs (flow relation),  $W: f \rightarrow t \{1, 2, 3, \dots\}$  is a weight function,  $MO: P \rightarrow \{0, 1, 2, 3, \dots\}$  is the initial marking,  $P \cap T = \emptyset$  and  $P \cup T \neq \emptyset$ . A Petri net structure  $N = (P, T, F, W)$  without any specific initial marking is denoted by  $N$ . A Petri net with the given initial marking is denoted by  $(N, MO)$ . The following part provide a petri network example

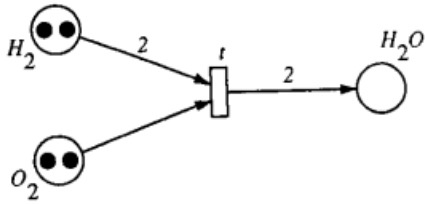


Figure 2.

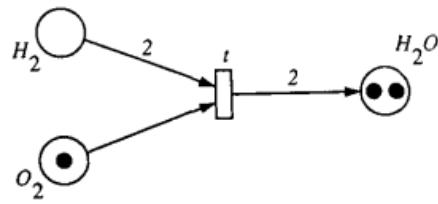


Figure 3.

An illustration of a transition (firing) rule: **Fig. 2.** The marking before firing the enabled transition  $t$ . **Fig. 3.** The marking after firing  $t$ , where is disabled. For the above rule of transition enabling, it is assumed that each place can accommodate an unlimited number of tokens. Petri net is referred to as a finite capacity net. For a finite capacity net  $(N, MO)$ , each place  $p$  has an associated capacity  $K(p)$ , the maximum number of tokens that  $p$  can hold at any time. For finite capacity nets, for a transition  $t$  to be enabled, there is an additional condition that the number of tokens in each output place  $p$  of  $t$  cannot exceed its capacity  $K(p)$  after firing  $t$ .

This rule with the capacity constraint is called the strict transition rule, whereas the rule without the capacity constraint is called the (weak) transition rule. Given a finite capacity net  $(N, MO)$ , it is possible to apply either the strict transition rule to the given net  $(N, MO)$  or, equivalently, the weak transition rule to a transformed net  $(N', M')$ , the net obtained from  $(N, MO)$  by the following complementary-place transformation, where it is assumed that  $N$  is pure (TADA0, MURATA, 1989).

In the past, it is still not ever used the Petri net to draw the process of trademark registration. The use of visual modeling techniques such as Petri nets in the design of complex Web services is justified. And web service behavior is basically a partially ordered set of operations. Therefore, it is straightforward to map it into a Petri net. Operations are modeled by transitions and the state of the service is modeled by places. The arrows between places and transitions are used to specify causal relations (Rachid Hamadi, Boualem Benatallah, 2003). The research will construct current trademark registration process in As-is model and improvement process in To-be model by Petri Network. The diagram will include the documents required, the processes involved, the times required for processing, and any loops in the processes that may result from searches that demonstrate existing names, claims, or objections to the registration of a trademark.

#### Step 4: Simulation Petri model on software

Simulation of the processes will enable the construction of an E-Trademark Service platform. And then to evaluate the performance of Petri network model from the quantitative tool.

#### Step 5: Compare result between to-be and as-is model

The study will construct the table which has included simulation information such as time, manpower, cost, and value-added data. And distinguish As-is and To-be simulation data for more visually to compare result.

#### Step 6: Result analysis

Finally, the study will analysis result and identify the worthless or non-value process. Then, to eliminate wasteful process and provides some future development suggestions for the conclusion.

### 3. Case study

The process of Trademark registration still exists many bottlenecks and wasteful steps. In order to improve performance and value-added of process, the study constructs the Petri network of the process of Trademark registration As-is model to identify worthless steps and provides the To-be model which includes E-Trademark registration platform to compare the different of these two models. Furthermore, the study will simulate the model and provides some Trademark infringement identification tools to eliminate the inefficiency of process.

#### 3.1 Data collection

The study's main subject is based on the process of trademark registration formulated by the government of Australia. According to the web of IP Australia, the study sorts out the outline of the trademark registration which include every parts of the process, and make the process as a photo to show every steps when a customer is going to register a trademark needs to participate.

##### 3.1.1 Collect trademark registration information

There are many different processes of trademark registration which is based on each corresponded country. The study is focused on the trademark registration process of Australia, therefore, many data were referenced from the IP Australia, and the rules formulated by the government of Australia also extend to the As-is model which was made in the study.

#### 3.2 Petri network model of Trademark registration establishment and simulation

##### 3.2.1 As-is model



Figure 4. Trademark registration As-is Petri network

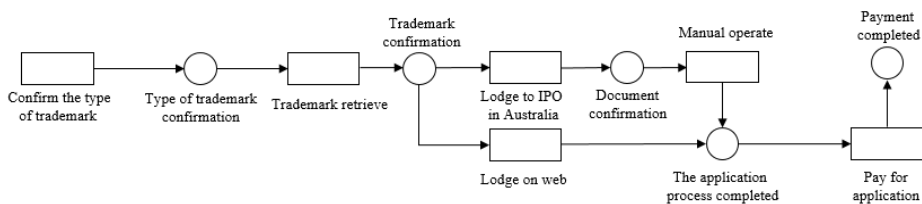


Figure 5. Drill down of Trademark registration agent

There are two ways while a customer want to register a trademark, one of which is registered by themselves, the IP Australia provided online register and physical agency register for everyone who need to apply a trademark, however, we can not change the registered process which was formulated by the government of Australia, thus, the study only discuss on the process. The other way is found a agent who was profession about registered the trademark and paid the fixed cost and the processing fee, the study is trying to decrease the overhead in the process, and make the customer paid less money but the agent got more benefit.

### 3.2.2 Problem

There are several elements at the drill down model, while the customer deal with the agent, the agent will confirm the trademark are useful or not, after doing some preliminary examination and make sure the trademark was not used by other people, the agent will lodge the trademark datas to the Australia government. Finally, the IPO Australia will charge while the trademark datas was lodged.

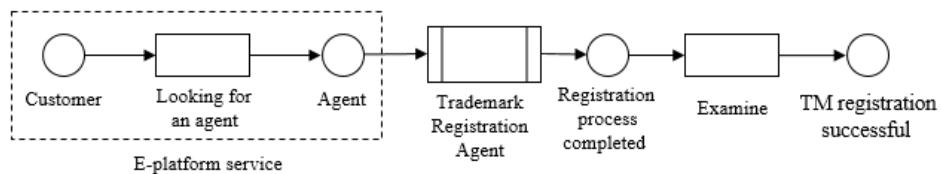


Figure 6. Problem of As is model

There are some wasteful and non-value process in As-is Trademark registration model like figure 5. There are many wasteful resources in information transmit process if customers contact agent directly. Then, due to different type of trademarks have different agents, it will waste many times for looking for a suitable agent. So the study constructs E-platform to service trademark register and eliminates the process which consumes many time and manpower to submit and inspect the trademark application documents.

### 3.2.3 . To-be model

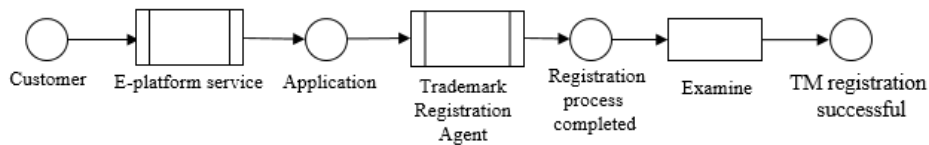


Figure 7. Trademark registration To-be Petri network

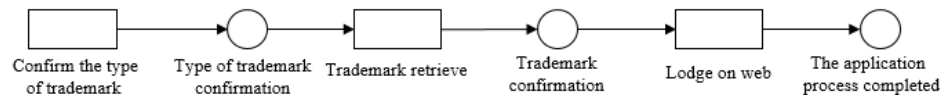


Figure 7. Drill down of Trademark Registration Agent

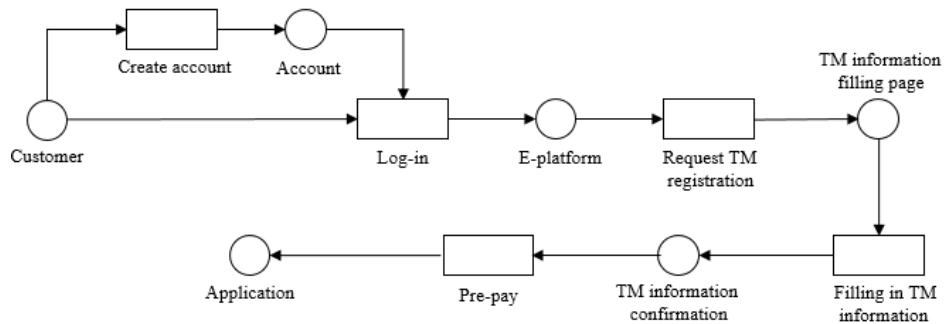


Figure 8. Dirrl down of E-platform service

The study rebuild the Trademark registration To-be model through E-platform like figure 6. The different with the As-is model includes eliminates some manual and worthless process, and constructs E-payment environment for ustomer. It will match customer with professional agent automatically by E-platform service. Furthermore, whole of document, information, and data can transmit immediately through E-platform service to replace As-is customer information transmit barriers environments.

The E-platform service process has showed in Figure 8. When customer who what to register trademark by E-platform, they need to create account if users were non-member. Then, member can log in by import their account data. When member log in to Trademark registration page, they need to fill the Trademark information and register request in Trademark information form. Finally, member needs to pre-pay for E-platform charge first and the application will be sent to IP Asturalia.

The Trademark registration Agent process has show in Figure . The process has be eliminated by E-platform service which application has sent to IP Asturalia to inspect. By the way, if trademark has already infringement or reuse by another trademark through examine step, it will close looped to E-platform trademark filled information page.

The E-platform act as trademark registration application agent service. The purpose of study is improve performance of Trademark registration process and value-added. It is mutualism and optimization between register and operater from E-Trademark registration platform.

### 3.3 Result Analysis

	Trademark registration service		
	As-is	To-be	*Improvement
Time	7494.5(hrs)	5105.5(hrs)	31.87%
Cost	1,015,520	715,520	29.54%
Value-added	208000	258000	24.03%
Manpower	7	3	57.14%

Table 1. Simulation result

Due to the E-platform we added in the to-be model, the study noticed that through the concept of the E-platform, the customer and agent can both save many resources such



as money, time, manpower, invalid messaging, etc. The E-platform not only provide an easier way to the customer who need to apply a trademark, but also create a simplest operating process to the agent. Based on the above condition, the study makes a simulation and result of both model, it has significant improvement for time, cost, value-added, and manpower like Table 1. Due to the E-platform eliminates some manual and wasteful process, so the time and manpower of trademark registration have significantly reduce. For example, it's depend manpower on examine, retrieve, and confirmation trademark in As-is model. But the manual operation process will replaced by E-platform service in To-be model. It seems like don't need some manpower to handle trademark registration process.

#### 4. Conclusion

For the purpose of making trademark registration process on the e-platform, the paper develops rebuilt the process and methods which includes trademark registration survey, business process rebuilding, petri net diagram analysis and automatic retrieval system. In the platform, it provide more efficient way for client to register trademark and shorten the information delivery path between client and agent; moreover, simulation result comparison shows that performance will be improved by adding client's trademark value and reducing time, cost and manpower. The research results helps companies maintain and build their brand equity and provide the customers with a solid guarantee that the best practices have been used to prevent the introduction of counterfeit goods into the supply chain. With the global expansion of markets for generic drugs, organic foods, regional products and cultural artifacts, the Internet has been widely exploited to infringe on the intellectual property of others. The Internet serves as the best platform to construct a e-trademark registration and monitoring system.

In the future, it can not only provide trademark registration service but construct a database for trademark registered on the platform for infringement searching. Trademark infringement searching and monitoring system can prevent website using unauthorized trademark on their goods and service, so that trademark value will increase continuously.

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