BUSINESS ENTITIES MAPPING PORTAL:
BUSINESS PRODUCT TYPE CATEGORIZATION

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TALENTINFRA SDN. BHD.

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BUSINESS PRODUCT TYPE CATEGORIZATION

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requirements for the degree of Master of Science
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Student's Declaration

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Abstraks

Dalam abad teknologi maklumat terkini, enjin pencarian telah amat popular antara penduduk. Bagaimanapun, kebanyakan daripada keputusan-keputusan dikembalikan oleh enjin pencarian tidak berkaitan dengan apa yang sebenarnya dicari, terutamanya bagi satu pemilik perniagaan. Oleh itu, terdapat keperluan sebuah jentera yang boleh menyediakan hubungan-hubungan perniagaan bermakna telah diwujudkan.

TalentInfra, syarikat yang akan dimulakan, berharap untuk menyelesaikan masalah peniaga dengan memperkenalkan entiti perniagaan itu portal. Dalam disertasi ini, hanya mekanisma berkaitan dengan pengkategorian jenis produk dalam entiti perniagaan dibincangkan.

Mekanisma ini mereka supaya syarikat-syarikat dalam bidang-bidang produk tertentu dikategorikan bersama. Ia mengumpulkan syarikat-syarikat dalam bekalan serupa dan rantai permintaan Enjin pencarian di pasaran seperti Google biasanya menyediakan maklumat yang tidak berkaitan dengan perniagaan, dan ini tidak membawa manfaat kepada peniaga.

Dengan mekanisma ini, ia adalah diharapkan syarikat-syarikat itu boleh mempunyai fokus lebih baik dalam memperluaskan peluang-peluang perniagaan mereka.

Abstract

In this age of information technology, search engines have been very popular among the Internet users. However, very often the results returned by the search engines are not too relevant to what one person is actually really looking for, especially for a business owner. Thus, there is a need to have an engine that could provide meaningful business contacts associated with product type.

Business-users experience difficulties filtering result from many irrelevant results returned from web. He may need to spend long hours to actually find what he needs, and in worst scenario, he may not get the result at all. TalentInfra, a company to be started up, hopes to resolve this business-user pain by introducing a business entities portal. In this dissertation, only the business entities mapping mechanism is discussed.

This mechanism is designed to categorize companies who are interested in consuming, producing or associating with similar product types. It aggregates companies in similar supply and demand chains so that companies are able to search for the relevant business contacts. The current search engine, such as Google and Yahoo do not provide business contacts by entering a product type. In fact, search engines provide non-business relevant information, which is useless to the business-users.

With this mechanism, there is hope that the users can have better focus on expanding their business opportunities.

1. Executive Summary

Since the early 1990s, the increasing popularity of the World Wide Web (Web) has attracted more business owners to adopt the Internet as a new business platform to widen their business contacts in the supply and demand chain. Many marketing and support services have been moved from the traditional yellow pages advertising to interactive and rich graphical web contents. This market shift has created a pain among the Web users with an overwhelming amount of unfiltered, uncategorized and untagged information. As a result of such overloaded information from the Internet, a simple search from the Web often gives rise to tens of thousand of pages of search results, most of which are irrelevant to a business owner. There is certainly a need now to have a tool that could provide meaningful business contacts associated with a product type.

With this problem in mind, TalentInfra Sdn. Bhd. is incorporated to research, design and develop an innovative web-based mini search engine embedded in a business networking portal, called Business Entities Mapping Portal. It is hoped that this business networking portal will eventually support both the start-ups and existing business entities in the supply and demand chains. In this dissertation, only the business entities mapping mechanism is discussed. The remaining components of the business networking portal will be handled by the other two team members.

The Business Entities Mapping mechanism has been designed to allow a company to search for possible business suppliers, customers and competitors in a particular business field. The mechanism maintains a knowledgebase containing a hierarchy of

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product types, entities profiles and contact information that will help the business communities and voluntary organizations to access various sources of vendors' information. With this mechanism, it is hoped that companies can better position themselves and mobilize their resources to deliver better products or services to the market.

In this dissertation, the primary approach is to establish and maintain a hierarchical structure of related product types, so that each product type will lead to a business entity in the supply and demand chain. The main challenge is the automatic categorization of product types based on the company description of business entities available over the Internet, and also the semi-automatic establishment of a comprehensive hierarchy of related product types from various sources of reference.

2. Introduction to the Company

2.1. Company background

TalentInfra Sdn. Bhd. is co-founded by Yong WaiYin, Khoo LeanSee and Wong Si-Maan to deliver a business networking portal to support the user-oriented business communities. The three co-founders are specialised in corporate management, computer system administration and software development. The company will be incorporated only in 2010, so that the three co-founders can concentrate on completing their master's degrees.

The mission of the company is to promote a business entities mapping portal at the national level, which will be used internationally without geographical restriction. As such, more business ventures and financial supports are needed in order to achieve this mission. The company will be applying for Multimedia Super Corridor (MSC) Malaysia status.

The company aims to obtain its financial support from the pre-seed fund of Multimedia Development Corporation Sdn. Bhd. (MDeC). This programme addresses the funding gap at pre-seed stage and is expected to boost the development of commercially viable information and communications technology (ICT) projects [1]. Once incorporated, the company plans to apply funding of Research and Development (R&D) Grant Scheme from MDeC to continue this business venture. RM85 million has been allocated for the MSC Malaysia Research and Development Grant Scheme (MGS)

which will provide a non-repayable grant of up to 50% of the approved total project cost to develop the company's R&D programmes [2].

2.2. Business Intent

Initial study reveals, as business services move to the web, it becomes increasingly important to automate the way buyers and sellers find each other [3]. Clearly, some sort of automated advertising and discovery mechanism is needed. Blind searching on keywords is no longer viable as it produces too many false misses as well as too many false hits. What is needed is a context that provides semantic meaning to the search terms.

The users' pains are the need to spend long hours to surf the web and manually filter the findings to obtain the required information. This is very time and energy consuming especially when the volume of data grows. For example, when a user is looking for a laptop supplier, he enters the keyword 'laptop' in a Google search, there are several thousand results returned. He may need to look through the list of results in order to get the required information. In the worst case scenario, his interested result appears at the bottom of the result list, and thus he is unlikely to get the desired result.

The business entities mapping mechanism provides organized information to the users. It resolves the pains of the users, who are the new start-up companies or existing companies who want to diversify into new business domains. This organized information includes the list of suppliers, customers and competitors profile for a particular product.

For example, when a user enters product type of 'computer' in the proposed mapping portal, computer related business entities will be listed. The list includes computer distributors and computer sellers. In this scenario, the computer distributors may appear as suppliers for computer sellers. The business entities mapping mechanism categorizes the entities from company description of business entities available over the Internet. It filters the unnecessary information which is not related to the user's interested product, and provide only needed context to the users. It aims to enable new companies to find their best-matched business partners or customers and thus able to kick-start their businesses in a shorter duration. For the existing companies, the mechanism is able to help them to diversify their businesses.

To compete successfully in today's volatile and competitive business markets, mass marketing is no longer a viable option for most companies [4]. Marketers must attack niche markets that exhibit unique needs and wants. When a company intends to diversify into a new business domain, there is a need to focus on a market segment by looking into micro-marketing [4]. Large search engine companies do not want to associate themselves with this minority group of Small and Medium Enterprise (SME)s [5]. The motivation for this research is to help the SMEs to improve their net profits by providing an easy method to obtain the relevant information regarding business partners or competitors. This provides the management of SMEs a good guideline for making the right business decision.

2.3. Growth Strategies

2.3.1. Financial Strategies

The initial plan to kick-start this project is to seek for funding from MSC Malaysia's Technopreneur Pre-Seed Fund from MDeC. The funding will be used for the development of the product prototype. Seed fund from venture capitalists will be applied to bring the business to market.

The business entities mapping portal will be released into market to initiate user based. This helps to build the viral market and thus the user base can be widely built. If the company has a broad userbase, income can be generated through affiliate program, or by advertising for other business entities. Besides, the company will introduce new applications from time to time, where users are free to upgrade their applications with some charges applied.

2.3.2. Technology and Product Development Strategies

Visual C# is selected for the codes implementation of the project and it is running in .Net 2.0 framework. C# is an object-oriented programming language, which ensures the systematic and object-oriented design of the system. Microsoft Visual Studio 2005 had been chosen as the Integrated Development Environment (IDE) of the codes development.

Microsoft SQL server is used for project database as it provides better data security. Open source is not selected for the development as the company is looking forward a better support of the development platform and thus available for better concentration for business exploration.

The product development will be divided into two phases. The initial phase will focus on the business entities mapping mechanism, while the second phase will focus on the uniqueness of the portal itself. In the first phase, the portal focuses only on the business entities mapping mechanism, which allows the users to search for their interested information. This will take shorter time to build and establish the image of the product.

2.3.3. Marketing Strategies to increase market or mind share

The company strategizes to launch the business entities mapping mechanism into the market for users to search for their interested information. The other two members of the company will handle the remaining components of the portal. Some applications will be added in order to increase the attraction of the portal. Users' stickiness to the portal is important so that users will regularly login and spend time in the portal.

After the launching, the business entities mapping portal will need to be upgraded from time to time with other new applications to improve the features. Enhancements are planned to be added-on after the launching, so that user base can be created earlier, and thus a sizable network can be generated earlier. Sales and marketing personnel will need to approach the merchants or sellers to advertise their products or services on the portal. The advertising volume is highly affected by the size of the network gained by the portal.

In order to advance and optimise user's business opportunities, the company will provide support for users, especially those with less information technology related knowledge. Packages can be introduced to the users for creating their company websites, and to maintain their business profiles. Users will be charged for the packages or support provided.

Viral marketing, a marketing phenomenon that facilitates and encourages people to pass along a marketing message, is important in promoting and widening the user base of the portal [6]. Viral marketing depends on a high pass-along rate from person to

person. If a high percentage of recipients forward something to a large number of friends, the overall growth snowballs very quickly. If the pass-along numbers get too low, the overall growth quickly fizzles. The viral promotion including newspapers, newsletters, direct mails, mail drops, flyers, radio advertisements, and sponsorships. Besides, it can be word-of-mouth delivered or enhanced by the network effects of the Internet [7]. Word of mouth is a reference to the passing of information from person to person [8].

In addition to the viral marketing, the promotion medium includes door-to-door sales. Sales persons will approach new and existing business entities, so that they are aware of the existing of the aggregator, and will start to use it. Promotion package may be introduced to the newly joined early birds. The promotion package allows them to have 90-days free advertising on the web, discount for email subscription, etc.

2.4. Market Target

The targeted users are those who wish to expand their social network and get relevant information from their business partners. The mentioned business entities targets are users who want to start-up a new business or those who want to diversify and expand their business. CEOs from SMEs who wish to establish small niche markets that can be better served by the small start-up companies are most suitable to use the portal.

As a web-based application, targeted market of the portal does not scope down to a particular location. Information of the portal can be shared among users without the limitation of distance. In this business entities mapping portal, business marketers are the targeted market. Business markets can appear as suppliers, competitors or consumers, depending on the product they offer, and who are the potential buyers.

As the initial phase of the portal, it supports connection with average internet connection speed. Mobile users will be targeted when the upgraded version of the portal is promoted. When the new version is available, mobile connection will be supported and thus CEOs can connect to the portal more easily using their mobile devices.

With a correct market targeted, revenue stream can be generated. Revenue model will be discussed in the next section.

2.5. Revenue Model

Revenue model shows possible ways for the company to generate revenues by specifying how it is going to charge the services provided.

In order to initiate the use of the portal, a three-month free advertisement at the portal is offered for the registered business entities. During the economy crisis, people want to spend less but generate reasonable revenue to their company. Free advertising may encourage the business entities to join the portal. When they are used to the advertising service, they are likely to continue using the service with reasonable price.
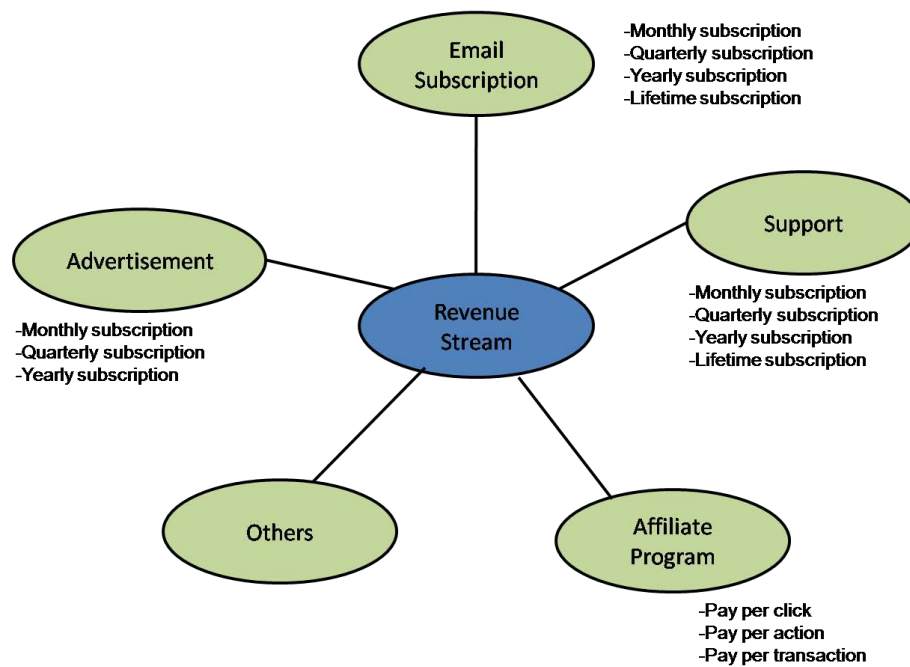
Figure 2.1 Revenue model of business entities mapping portal.

a. Advertisement (Sales)

Without subscription to the advertisement, registered business entities will only show their profile information such as company name, company address, contact person, product types, etc., as what they entered during registration in portal. Besides, there is no up-to-date or latest promotion detail about their company on the portal. In other words, login users will not see the highlight of this business entity. The login user can be SME's CEO who is looking for a business partner, or a registered business entity of the portal.

Table 2.1 shows the outcome of a business entity who subscribes for advertising. Subscribed advertisement has higher visibility and more exposed to users.

Table 2.1 Benefits of subscribing for advertisement.

Subscribe for advertisement	Does not subscribe for advertisement
Business entity company's profile and promotion is published at any time	Business entity company's profile and promotion is NOT published.
High visibility	Low visibility
One-click access [Figure 2.2]	Multiple-clicks access [Figure 2.3]
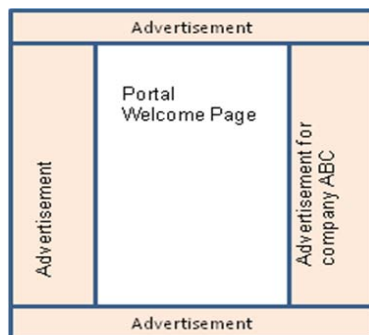
Figure 2.2 Access to profile company ABC in business entities mapping portal.

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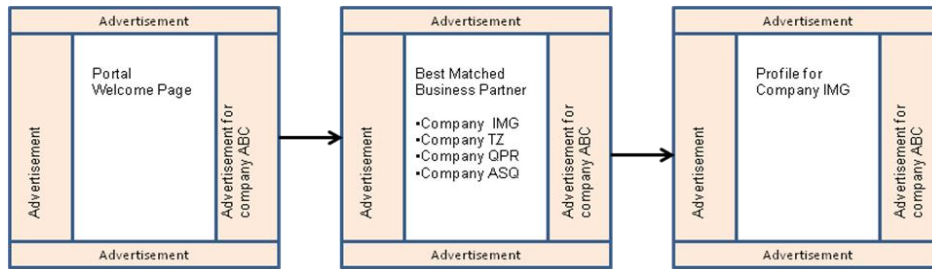
Figure 2.3 Access to profile company IMG in business entities mapping portal.

Figure 2.2 and Figure 2.3 show navigations from portal to access to the advertisements posted. Company ABC subscribes for the advertisement, but company IMG does not subscribe for it. For company IMG, login user needs to search for best-matched business partner, and access to the company from there. This takes more clicks compared to accessing company ABC. User may not be able to see this profile, if the company IMG is not listed as the best matched business partner.

Number of clicks / steps taken to reach the required information is significant. Study shows online users are likely to spend fewer steps to access to their required information. They might give up when many steps are required to retrieve the information. Studies show that between 1% to 3% of viewers will click through to a site from a banner ad [9].

Charges for the advertisement vary, depending on advertisement size and format, and impression (page view) for the advertising. This is closely related to the eyes tracking technology, which is a process of measuring the motion of an eye relative to the head [10]. Study shows that an advertisement above the fold can charge a higher

price than an advertisement below the fold where it is not going to be readily visible to audience [11].

The site's traffic, the brand name, desirability of the site's target market also affects the charges of the advertisement. The advertisement payment model will consist of monthly, quarter or yearly basis.

b. Email Subscription

By portal default, users only view profile of relevant companies from the web. If the registered business entity subscribes for advertising, then user will able to view the advertisement without searching through. Anyway, these activities are passive. The advertisements do not reach the users if they are not connected to the portal.

By email subscription, the system will send out the promotion to the users in the user-base with consent. Thus users will be able to receive the notification about the highlights and promotions even though they are not connected to the portal. A link will be provided in the email, so that the user can click on the link to access the portal and subsequent advertising company website if he is interested in the promotion. Registered business entities who want to promote the products of their company can choose to subscribe whether to send the mails on selected category, to business starter only, send by industry area or product type, etc. Charges will differ based on the selected segment size. They can either subscribe the service for monthly, quarterly, yearly or for lifetime basis.

c. Support

Maintenance services or support can be provided to business entities that are not competent in optimizing the portal features for their business purposes. Some users are web-illiterate, and they may not know how to maintain their company profiles in the aggregator. As such, the company will provide services to maintain the information they want to publish on the portal.

The support level can be customized to suit the user needs. For example, some users know how to maintain their profile on the portal, but they may need assistance on some particular feature. In this case, they do not need to subscribe the full package of maintenance. This support service can be subscribed on a monthly, quarterly, yearly, or lifetime basis. Besides, the support service can be acquired and pay as per the request.

d. Affiliate program

Enrolling for affiliate program is one of the revenue streams for the business-entities aggregator. The revenue through joining an affiliate program can be earned by pay per click, pay per action, or pay per transaction.

In a pay per click payment type, instead of recommending specific products and services, the portal will simply put the link of the merchant on the website [12]. When a visitor or reader clicks on the advertisement, the company as the affiliate will earns a small amount of money. Pay per transaction, or pay per sales is an

affiliate program where the company as the affiliate only earns money when a sale is made through the affiliate link provided in the portal.

Beside, the portal will also consider enrolling for affiliate programme with pay per action. In this program, revenues are earned when the targeted visitors take specific action on the published web.

Unlike the advertisement subscription, business entities who take part in an affiliate program are not required to do promotion of company product in the business entities mapping portal. They advertise their company by only providing link in the portal, and they are only required to pay the portal when their website is viewed, depending on pay per click, pay per transaction or pay per action.

There are concerns on how the affiliate program, in which user may get the link from the portal, and access to the particular link in another time from another browser. In this case, the portal will not be able to earn the affiliate program commission. With this concern in mind, future works of research into web analytics at both the client side and the server side have been planned.

e. Others

Improving and enhancing the features of the aggregator will generate other revenue streams. The enhancement includes providing chat forum for business entities to discuss their products and services, cooperation with TELCO to send SMS notifications to relevant business entity when his profile is viewed by interested party, and other. The features added can be charged to those business entities with reasonable price to increase the revenue.

Table 2.2 summarizes sources of revenue and the estimated charge rate for each of the income source. The charge rate shown is a reference price. Combination of packages may have different pricing rate.

Table 2.2 Revenue sources for business entities mapping portal.

	Source of Income	Implementation stage	Target group	Charges rate (RM)
1	Advertisement	Initial	Business entities who want to promote their websites, including registered and non-registered users.	Large banner Monthly – 100 Quarterly – 250 Yearly – 950 Small banner Monthly – 50 Quarterly – 150 Yearly – 500
2	Email subscription	Initial	Registered users and advertisement subscribers	Monthly – 30 Quarterly – 68 Yearly – 188 Lifetime – 450
3	Support	Initial	Registered user with less web application knowledge	Monthly – 50 Quarterly – 100 Yearly – 500 Lifetime – 950
4	Affiliate program	Initial	Merchants who want to advertise their product or services through the portal.	Depends on commission offered by the merchants.

2.6. Operational Setup

The company will be operating in a rented office area in Penang. The company will host the portal and development will be done in-house. All the required work to get the business rolling will be operated from the office. Research and Development department will be setup to develop and test the portal, the management team to plan and strategize the operation, and sales and marketing personal to promote the portal by getting merchants to advertise their products or services.

2.7. Long Term Goals of Company

With globalization and internet, business is not limited to a particular area. The long-term goal of the company is to enhance the portal to become a business entities communication portal, then promote and extend it globally to achieve a huge user base. In addition to gaining social networking base, the company plans to attract merchants to advertise on the portal, and to promote applications for business entities through the portal. With a huge social network base, the company will be able to introduce and market new applications to the users.

2.8. Market & Competitors information

Market and Competitors Analysis for Business Entities Mapping / Aggregator

In business entities mapping, micro-marketing is targeted as the business domain. Customers today perceive themselves as having unique needs and interests, and they demand that businesses understand and meet those individual needs. To satisfy these customers, business entities aggregator shift from casting a wide marketing net as other competitors do, over a vast crowd for small markets. Table 2.3 compares the search results returned by search engine and Business Entities Mapping when a product type is entered.

Table 2.3 Comparison of search result from Business Entities Mapping and indirect competitors

Google	Bing.com	Business Entities Aggregator
- Product reviews - Product type wikipedia - Product type advertisement - Product user manual / guideline - Blog posts about product type - Product type news - R & D on product type - Forums on product type - Product type images	- Wikipedia about the product type - Product type seller website - Product type images	Only business entities : - Business competitor - Potential customer - Potential supplier

Reputable search engine such as Google, Bing, Yahoo, MSN, Blackle, etc. do not limit the search results to business entities. When a user enters a certain product type, the search engines will return everything, and most of the result are not business relevant.

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Table 2.4 compare features provided by existing online yellow pages and Business Entities Mapping. Online yellow pages has appeared to be direct competitors of this feature, but there are some limitations on existing online yellow pages, compared to the business entities mapping.

Table 2.4 Comparison of search result from Business Entities Mapping and direct competitors

	Feature	SuperPages	Malaysia Yellow Pages	Business Entities Mapping/Aggregator
1	Information base	United State	Malaysia	Initial start with information base in Malaysia, will extend to foreign country in future
2	Synonyms of product type	No	No	Yes
3	Company description	No	No	Yes
4	Company URL	Yes	No	Yes
5	Company list population	User register to the side	User register to the side	Data extraction from web, user register to side for additional.
6	Registration of company	Yes	Yes	No

Most of the existing online yellow pages are based in western country. Besides, those online yellow pages require user to register in their website in order to enable their company to be listed in the page. For business entities mapping, company description will be extracted from web. In this case, the company list is unlikely to provide empty data to user. In business entities aggregator, synonyms are used for business product type categorization.

Market and Competitors Analysis for Business Entities Mapping Portal

The indirect competitors of business entities mapping portal are social networking portal such as Facebook and LinkedIn. Facebook, http://www.facebook.com is a hot story in social media circles. Users can join networks organized by city, workplace, school, and region to connect and interact with other people. People can also add friends and send them messages, and update their personal profiles to notify friends about themselves. LinkedIn, http://www.linkedin.com is a networking tool that allows registered users to maintain a list of contact details of people they know and trust in business [13]. Users can invite anyone (whether a site user or not) to become a connection or to find any entity within the networking tool [14].

Besides, there are many direct competitors such as Spock, Jigsaw, mystyle.com.my, superhero.com and other B2B or B2C e-commerce applications. Spock, http://www.spock.com is a people search engine, which able to perform searches for a class of person such as politicians and people associated with associates with a topic. Spock robot automatically creates tags for any person it finds, by gathering the info on people from wiki, social networking sites such as LinkedIn and Facebook. It searches for a class of person such as politicians and people associated with associates with a topic. Jigsaw, http://www.jigsaw.com, is another people search engine oriented prospecting tool used by sales professionals, marketers, and recruiters to get fresh and accurate sales leads and business contact information. As sourcing and recruiting tool, Jigsaw can quickly identify ideal candidates for user's marketing purposes [15].

Mystyle, http://www.mystyle.com.my, is a B2C application, which allows merchants to register in order to promote and sell their products, while consumer is able to login into the site make purchase.

Table 2.5 illustrates summary of features comparison among Business Entities Mapping Portal, indirect competitors and direct competitors. The existing direct and indirect competitors provide the features for information sharing, but these portals target to individuals, or rather mass marketing.

Table 2.5 Comparison between the proposed venture, Business Entities Mapping Portal and competitors

	Feature	Indirect Competitor		Direct competitor		**Business entities mapping portal**
		Facebook	LinkedIn	Spocks	Mystyle .com.my	
1	**Propose possible business partner**	-	-	-	-	√
2	**Propose possible relevant business field**	-	-	-	-	√
3	**Propose potential needed supplier**	-	-	-	-	√
4	**Allow advertising**	-	-	-	-	√
5	**Business partner ranking**	-	-	-	-	√
6	Register as user	√	√	√	√	√
7	Social networking portal which allow users to communicate among each other	√	√	-	-	√
8	Search for interested entity	√	√	√	-	√
9	Create entities grouping	√	√	-	-	√
10	Forum for idea / feedback sharing	√	√	-	-	√
11	Promote product or services	-	-	-	√	√
12	Gather entity database from other social networking portal	-	-	√	-	√
13	Recommend possible associates	-	√	-	-	√

2.9. Strengths, Weaknesses, Opportunities and Threats.

- Strengths of the business entities mapping / aggregator

The strength of the business entities mapping portal is to provide a more effective search engine for the SMEs. When the aggregator is compared to the existing competitors in the market, the available social networking portals are only on social community communications.

- Weakness as of the venture

The business entities mapping portal is a new entry to the marketplace. It needs time to establish a good image and high visibility among the communities.

- Opportunities of the venture

During the economy downturn, there are many start up companies. This is the right time to introduce the business entities mapping portal to the market, so the new business entities can market and promote their services and products, and retrieve their required information through the venture introduced. Besides, business entities mapping portal provides healthy competition among merchants and sellers. This benefits the SMEs in getting their business benefits.

- Threats of the venture

The threat of the venture is big software companies might produce more effective portal in a shorter timeframe.

3. Employment of Knowledge Workers

3.1. Management Team

TalentInfra is made up of the initial management team of three co-founders. The initial management team during the start-up stage are Khoo LeanSee as Chief Executive Officer and Chief Operating Officer, Yong WaiYin as Chief Technology Officer, and Wong Si-Maan as Chief Financial Officer. Figure 3.1 shows the management team structure of TalentInfra.

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              ┌─────────────────────────┐
              │ Chief Executive Officer,│
              │      Khoo LeanSee       │
              └─────────────────────────┘
        ┌──────────────┐
        │  Advisor,    │
        │    TBD       │
        └──────────────┘
  ┌────────────────────┬───────────────────────┬──────────────────────┐
┌─────────────────────┐ ┌─────────────────────┐ ┌─────────────────────┐
│Chief Operating      │ │Chief Technology     │ │Chief Financial      │
│Officer,             │ │Officer,             │ │Officer,             │
│Khoo LeanSee         │ │Yong WaiYin          │ │Wong Si-Maan         │
└─────────────────────┘ └─────────────────────┘ └─────────────────────┘
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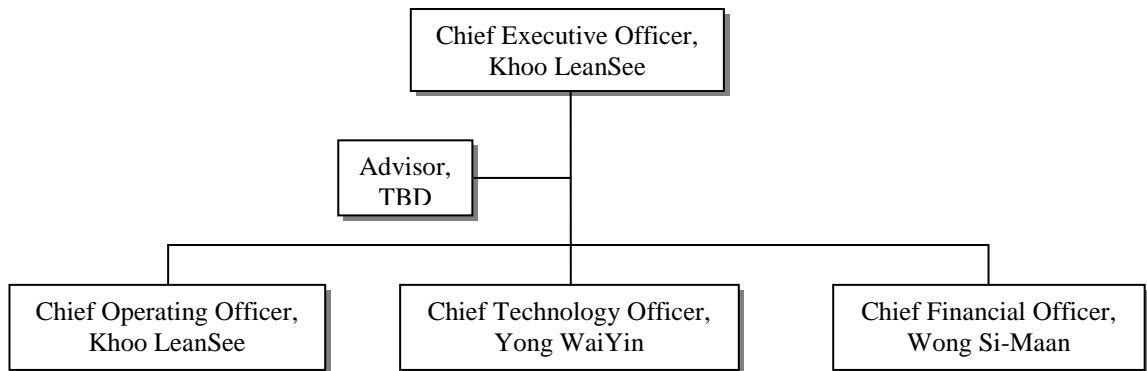
Figure 3.1 Management team structure of TalentInfra

a. Khoo LeanSee, Chief Executive Officer and Chief Operator Officer

Khoo LeanSee is appointed as Chief Executive Officer and Chief Operator Officer. She obtained a Bachelor of Science (Honours) degree in Computer Engineering from University of Nebraska-Lincoln. She had 8 years of working experience in system administration field from 4 multinational (MNC) companies. She is

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