BID: Case Study of a Design Innovation Network Model in Thailand

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Thailand has started setting up industrial base to assist industrial sector in order to reduce importation since 1957 (Srisook, 2007). Since then, the Government has promoted skill labour and production technology. Thailand is known as a 'cheap labour and quality production' country (Srisook, 2007). This gives more opportunities for foreign investors and the Thai industrial sector for export. A majority of Thai manufacturers are own-equipment manufactures (OEMs). Since 1997, the manufacturing sector in Thailand has declined. One of the critical reasons was the slump of the country's economy in 1997. Also, there are new emerging manufacturing-based countries, i.e. China, India and Vietnam that offer massive production labour and better manufacturing cost advantages. The Thai manufacturing sector cannot depend on the labour cost and quality production strategies to compete with these emerging countries. To survive and compete in both local and international market, it needs to find a new strategy.

Design has been promoted as a strategic development for the industrial sector in Thailand for almost 30 years. However, there has been no national design policy to guide the design directions for industry. The first design promotion unit, named Design Service Center (DSC) was established by the Department of Export Promotion, Ministry of Commerce in 1990. Its aim is to promote design as value-added for industrial products to increase the country's exports. The Thai design industry is in the early stage in comparison with Japan and South Korea. There are many design organisations helping to create the Thai design industry and promote design as value creation and innovation for industry, i.e. design educations, governmental agencies, non-governmental design societies, design

magazines, design consultancies, design knowledge centres and groups of professional designers. These organisations have been working to grow the design industry by the demonstration on how design can create strategic opportunities for brand, product, business and innovation.

To demonstrate the value of design for industry in Thailand, two main strategies have been widely used to transfer design knowledge: Outside-in and Inside-out. First, the outside-in strategy, the most popular and demanding one is to transfer design knowledge of successful design companies, centres and professions from abroad. This strategy includes the activities, such as seminars, exhibitions, talks, workshops and lectures. It mainly aims to target professional designers and manufacturers in order to transfer best practices in design thinking, methods, process, strategy and management. The second is the inside-out strategy. It mainly aims to transfer design knowledge from design educations, professions and services to industry for the development of design outcomes within the country. The activities are, such as design competition, design-business matching and young designer workshop. The inside-out strategy tends to generate design and design innovation possibilities for new commercial opportunities.

This paper suggests a new model of design knowledge transferring for the inside-out strategy, entitled Bidding Innovation and Design (BID). BID is a new initiative, initiated by Design Management Track, School of Architecture and Design (SOAD), King Mongkut's Technology University Thonburi (KMUTT) in corporation with National Innovation Agency (NIA) in 2006. The aim of BID is to build up links between design educations and manufacturing industries or investors through the support mechanism of NIA and Design Management Track. It is argued that strengthening strategic innovation by design through the BID initiative enables industries to increase innovation capability and all participants to create design innovation networks.

BID is initiated from three existing conditions. First, there is an urgent need of an innovation strategy for the manufacturing industries to survive. Design is considered as an appropriate one, regarding the nature of the country's production and knowledge labours. Secondly, there is a surplus of the final

year design projects of industrial design students that are created for their graduation every year. These design projects are viewed as commercial viabilities for new products and businesses. Thirdly, NIA, providing financial aids to support innovation activities for industries has recognised design as one of the key innovation strategies. The objectives of BID are as the following:

- To promote knowledge sharing among industrial design graduates, design educationists and manufacturing owners or investors.
- To encourage industry to invest on new product development by design
- To promote NIA's design policy to education and manufacturing industry
- To establish a design innovation network among design professionals, design educationists, manufacturing industries and NIA

This paper will elaborate the role of design management in planning and managing the initiative, the expected and unexpected benefits of all BID participants and lessons learnt from the first BID in 2006.

THAILAND DESIGN OVERVIEW

Thailand has started setting up industrial base to assist industrial sector in order to reduce importation since 1957 (Srisook, 2007). Since then, the Government has promoted skill labour and production technology. Thailand is known as a 'cheap labour and quality production' country (Srisook, 2007). This gives more opportunities for foreign investors and the Thai industrial sector for export. A majority of Thai manufacturers are own-equipment manufactures (OEMs). Since 1997, the manufacturing sector in Thailand has declined. One of the critical reasons was the slump of the country's economy in 1997. Also, there are new emerging manufacturing-based countries, i.e. China, India and Vietnam that offer massive production labour and better manufacturing cost advantages. The Thai manufacturing sector cannot depend on the labour cost and quality production strategies to compete with these emerging countries. To survive and compete in both local and international market, it needs to find a new strategy.

Design has been promoted as a strategic development for the industrial sector in Thailand for almost 30 years. However, there has been no national design policy to guide the design directions for industry. The first design promotion unit, named Design Service Center (DSC) was established by the Department of Export Promotion, Ministry of Commerce in 1990. Its aim is to promote design as value-added for industrial products to increase the country's exports. The design industry in Thailand is currently in the early stage in comparison with Japan and South Korea. There are many design organisations helping to create the Thailand design industry and promote design as value creation and innovation for industry, i.e. design educations, governmental agencies, non-governmental design societies, design magazines, design consultancies, design knowledge centres and groups of professional designers. These organisations have been working to grow the design industry by the demonstration on how design can create strategic opportunities for brand, product, business and/or innovation.

In the mid 2000s, the value of design is increasingly seen as part of value creation and innovation for the sustainable development of the national economy and individual firms. Mr Pansak Winyarat, the Chief Advisor of the former Prime Minister Thaksin Shinawatra argued that the country economy could not depend on the manufacturing-value-added model to survive in the long-run (Winyarat, 2005). It needs to be restructured to become a value creation economy, not competing on mass production and cost strategy, but focusing on differentiation and unique value. Design becomes one of the key strategies to enhance the national knowledge and development. Mr Supachai Lorlowhakarn, the current Director of National Innovation Agency (NIA) has also set design as one of the key innovation strategies, along with Bio-Business and Eco-Industry in order to drive the national economy. As a result, design has been currently promoting as a main national strategy.

Design education plays a significant role in the contribution to the establishment of the design industry. The first design department, named Industrial Design was established in 1976 (Srisook, 1997). Either Industrial or Product Design Departments have been running under the School of Architecture, Applied Arts, Decorative Arts or Industrial Technology. Over 20 universities have

currently run the design courses. In every year, there are over 400 design graduates. The role of design institutes is currently changing. In the past, design institutes trained design graduates to work as productive labours. In the Present, design institutes are trying to train design graduates to become creative labours. Though design studies have been established in the country for over 30 years, design management is not set up. Design management is a new subject in the design studies and is unknown to other studies, especially business administration.

BID OVERVIEW

BID, standing for Bidding Innovation and Design is an initiative, initiated by Design Management Track, School of Architecture and Design (SOAD), King Mongkut's Technology University Thonburi (KMUTT) in corporation with National Innovation Agency (NIA), Ministry of Science and Technology in 2006. It has invited the three universities and one governmental agency to be the initiative partners. The aim of BID is to build up links among new design graduates, design institutes and manufacturing industries or investors through the support mechanism of NIA and Design Management Track. NIA provides the technical and financial supports for potential innovation projects, i.e. Technical Support, Technology Capitalization, Good Innovation Zero Interest, Innovation Cluster Grant and Venture Capital (For detailed information, please visit www.nia.or.th). It is expected that the NIA's support mechanism would encourage industry to employ design to generate innovation productivity. In the BID Forum, the supports will be granted if industry requests to develop a design innovation project of new design graduate. It is also recommended that design management expert should supervise the co-development of any design innovation project in the BID initiative. The expert will be facilitator and mentor in an entire co-development project. As suggested by the Design Management Track, managing design effectively tends to protect some underlying problems which would decrease the chance of success in the co-development of design innovation. It is argued that strengthening strategic innovation by design through the BID initiative will enable industry to increase innovation capability and help all participants create design innovation networks.

The initiative is initiated from three existing conditions. First, there is an urgent need of an innovation strategy for the manufacturing industries to survive. To generate innovation opportunities, industry needs knowledge and financial supports.

Design is considered as an appropriate one, regarding the nature of the country's production and knowledge labours. Secondly, there is a surplus of the final year design projects of industrial design students that are created for their graduation every year. All of them are placed on the library shelves very year. These design projects are viewed as commercial viabilities for new products and businesses. Thirdly, NIA, providing technical and financial aids to support innovation activities for industries has recognised design as one of the key innovation strategies. According to these conditions, BID would be a win-win solution for all.

BID invited all of the following participants: new design graduates, design institutes, governmental agencies and industries to participate. Its objectives are as the following:

- To promote knowledge sharing among industrial design graduates, design educationists and manufacturing owners or investors.
- To encourage industry to invest on new product development by design
- To promote NIA's design policy to education and manufacturing industry
- To establish a design innovation network among design professionals, design educationists, manufacturing industries and NIA

To demonstrate the BID benefits to all of the expected participants, the first BID forum was organised in 20 April 2006. It invited them to establish a design innovation network. It was a platform to facilitate communication and connection and establish the relationships. It requested potential design innovation projects from the four universities.

Regarding the criteria of design innovation projects participating in the forum, design is more than just a fanciful thing. It is a developmental process. Innovation by design can initiate both incremental and radical product innovation; from revamping old, existing products, to initiating 'blue sky' product

concepts. Innovative design is usually an outcome of a process, which more participants and factors are involved (Thackara, 1997). Therefore, it should be holistically thought, not particularly focusing on specific aspects, such as aesthetic appearance, manufacturing process or commercial benefits, but also end users, social issues and ecological concerns.

Regarding this belief, the design innovation criteria were set up to select potential design projects of the new design graduates to participate in the BID forum. There was no limitation in any particular type of product, design or manufacturing industry. The final design innovation project could be, such as physical objects, systems, interfaces or systems. The key point is that the selected design projects must demonstrate a degree of innovation. As for the NIA's definition, innovation is defined as new things derived from the exploitation of knowledge and creativity, leading to the enhancement of social and economic value. According to this innovation definition, the selected design projects must have a degree of newness in one of the following criteria:

- Being able to describe their creative design which is distinguished from and/or far better than the existing products/processes/systems/techniques in the local, regional and/or global market.
- Being likely to be applied for patents or design patents on the intellectual property standard in Thailand.
- Having an innovative feature or an original idea in design which is likely to be further developed for commercial, social and/or environmental value
- Suggesting a new product/process/system/technique which derives from an intensive research, such as users' problems, existing product problems, market gap, technology push and/or new trend
- Experimenting on new form/material/structure/combination/technique/ function which ends up with an interesting innovative design
- Introducing new products/solutions/systems/processes in order to solve existing individual, social, cultural or ecological problems which nobody have suggested them before
- Having a clear and promising vision that the innovative product/process/ system/technique is likely to be commercially success in the targeted or new market

Thirty-two designs were selected and approximated 100 participants took part. The author will elaborate the role of design management in planning and managing the initiative.

BID PLANNING

According to the overall BID objectives, the collaborative network approach at the micro scale, named a micro network system is used to plan the initiative. It is a self-organising networking team of independent participants which temporary interact and work together to achieve a particular goal, and will, more often than not, disband once the goal is met (Bryne et al, 1993). The BID initiative provides a platform for the establishment of the connections and relationships that are developed among all participants, and which play some part in generating design innovation. The evolving micro network system could emerge everywhere because of its fluidity and flexibility. The example of the micro network system is a project-based collaboration. In contrast, the macro network system refers to the dense, complex networks of social and professional relationships which are supported by the region's or district's cultural and geographical atmosphere and/or institutional and technical infrastructure. The examples of the macro network system are innovation systems within industrial districts or regional clusters, such as the Cambridge and Oxford regions, German Baden-Württemberg, US Silicon Valley, the Italian industrial districts and Thailand Science Park. Interfirm networks, in particular SMEs, often play an underlying part in sustaining the economic prosperity of a region (Keeble et al, 2000) and firms' innovation performance (Lawson, 2000; De Propris, 2002). Though the dynamics of interfirm networks in the macro network system is flourishing the success of regional firms and each region, district or industry, the danger of this system is the development of the locked-in conditions, such as efficient productivity, well-established specialisations, collective market identity, and strongly relating ties and culture (Perry, 1999; Castells, 2001). Whilst this system has reached the mature, locked-in condition, it tends to be less fluid and flexible when radical innovations emerge outside the region or district. It is very difficult for the macro systems to sustain a flow of radical innovative products (Perry, 1999; Jolly, 2003). As a result, comparing the dynamics of the micro and macro network

system which would be suitable for the existing conditions in Thailand, the micro network system is more conducive for all stakeholders to sustain the development of design innovation.

There are 3 main models of the existing networks in Thailand: Industrial clusters (Industrial Park), Knowledge clusters (Science and Technology Park) and Community clusters. Unlike these sustainable and innovation networks, design innovation networks are not established in Thailand. Therefore, to plan design innovation networks, the network concept needs to be understood. According to Bussracumpakorn (2006), a network, by definition, consists of two components: (i) interacting parts and (ii) relations. In the living, evolutionary, or social systems, there is the third component, the attributes or the emergent behaviours of their interacting parts.

First, interacting parts are entities that interrelate. In social network analysis and graph theory, the interacting parts are represented as nodes. A node may represent a cell, a living organism, a person, an object or an organisation. In networks, the characteristics of the parts (nodes) can be either similar or diverse. For example, within a customer-supplier network, the attributed quality of the customer has inherent characteristics which are different from the supplier.

Secondly, relations are links between the interacting parts or sets of interconnected parts. In social network analysis and graph theory, relations are visualised as virtual lines which connect the interconnection of the interacting parts together. Knoke et al (1991) suggested the difference between entities of the interacting parts and relations that, on the one hand, some attributes of a part persist across the various contexts in which the part is interacting (such as quantifiable and discrete qualities). On the other hand, relations are context specific and alter or disappear. For example, in a customer-supplier network, a customer and supplier relationship does not exist outside a business setting, or a supplier-customer relationship vanishes when the contractual project or the business transaction is terminated. Knoke et al (1991) also suggested that a wide variety of relational properties can be measured, such as the strengths of the friendships and the economic exchange between customer-supplier networks.

Thirdly, the attributes or the emergent behaviours or properties of their interacting parts are the relations between relations, and also between the relations and the whole interacting parts. Therefore, the attributes of networks emerge from a whole set of a system of interacting parts, their relations, and the relations of the whole interacting parts. For example, the efficiency of the Toyota's Just-in-time production process is an emergent property of the whole supplier-customer networks.

According to the network concept, three components are considered when the BID initiative was planned: interacting participants, relations and the emerging behaviours of the interacting participants.

The expected interacting participants are: new design graduates, design institutes, industries and governmental agencies. Understanding the nature and role of the interacting participants is significant in the establishment of a design innovation network. It is argued that if each participant contributes its own role to the whole network, design innovation will emerge. First, new design graduates offer new innovative design ideas for product/business opportunities. They need to convince industry on their ideas. Secondly, the graduates' design projects had been through the reliability of research, design and development process, and under close supervision of well-trained design tutors. Design institutes provide an affirmation of very rich and useful design knowledge. Thirdly, the nature of industry in Thailand is manufacturing or marketing-based. Design is seen as the company's expense, rather than long-term investment. This implies that industries may lack design knowledge, resource and fund. As a result, innovation by design has not been flourished. Finally, governmental agencies are willing to support industry committing on any design innovation project.

The second component is relations. In the BID initiative, the relations among the interacting participants are expected to be collaborative and decentralised via a mediator. To link all of the expected interacting participants together, it is very difficult to let it happen naturally without any support. On the networking relations, design management is a catalyst. Because design management is a new subject in the country, without demonstrating it, it is difficult to understand the role of design

management and its relation to the initiative. The initiative is trying to bridge all participants in the establishment of the following relations: communication, connection and collaboration.

The final component is the emerging behaviours of the interacting participants to generate a sustainable design innovation network. It cannot be planned because it is emergent. Therefore, managing a BID platform is very significant to achieve the final component.

MANAGING BID

Managing the BID initiative is challenging, especially a platform that allows a design innovation network to emerge. The initiative introduced a BID forum. The BID forum is a platform to establish the relations among the expected interacting participants and to flourish the emerging behaviours of the interacting participants. To do so, two key issues are very significant in managing the BID forum: Forum Management (including Non-disclosure Agreement, Design Presentation and Bidding Process) and Intellectual Property Management (IPM).

Forum Management

Before the BID forum, the BID initiative website, www.arch.kmutt.ac.th/bid, was launched so as to communicate and connect with all targeted participants. All targets were invited to join the forum by invitation. Potential graduates' design projects were selected by the participating universities, following the BID's design innovation criteria as mentioned above. There were 32 design projects in the forum, categorised in 9 groups: (i) Furniture and Home-decorative design, (ii) Leather design, (iii) Toy/Game design, (iv) Ceramics design, (v) Fashion and Textile design, (vi) Recreational design, (vii) Electronic design, (viii) System/Service design and (ix) Packaging Design.

In the forum, there were two bidding rooms running in parallel. All design projects were allocated equally in each bidding room. Each room had a small exhibition corner for the design projects. There were three bidding sessions: morning, afternoon, and late afternoon. The allocation of the design

projects in each session was based on the attractiveness and degree of design innovation. It was judged by the design description provided by the participated design graduates and the design innovation criteria. The strategic categorisation in a particular design type had not been implemented to the allocation of the bidding sessions because it may not generate the dynamics of bidding activities between both rooms. Also, potential bidders would be able to explore creativity and innovation across the industries. The most interesting design innovation projects were presented in the morning session. This strategic planning was focused on the manufacturer's behaviour. Generally, manufacturers are quite busy. They cannot spend a whole day in the forum.

In each bidding room, there were two bidding mediators to support new design graduates and to facilitate effective bidding procedure: bidding host and bidding time-controller. The bidding host facilitates bidding procedure, for example, introducing new design graduates, stimulating potential bidders, asking interesting questions to both designers and potential bidders and monitoring bidding environment. The bidding time-controller is in charge of time control in each presentation. In front of the bidding rooms, pictorial timetables showing the BID design projects were provided to all participants.

Each design graduates had 10 minutes to introduce his/her design innovation and another 10 minutes to answer bidders' enquiries. The presentation of each designer in the first ten minutes was done verbally in support with PowerPoint presentation. Before the actual presentation in the BID forum, there was a BID workshop for fresh designers on how to present and protect intellectual design property. Each designer prepared his/her CV or Resume to give to potential bidders who were joining the bidding rooms.

Bidding process is part of the BID forum. It is a critical process that industry decides to connect and collaborate with the other participants. The bidding process is shown in Figure 1. As shown in the Figure 1, after the graduates' presentation, if interested in a project, BID participants can fill in a

design reservation form, and hand it to the graduate or the BID organiser. The bidder will be contacted back by the university that owns the design project.

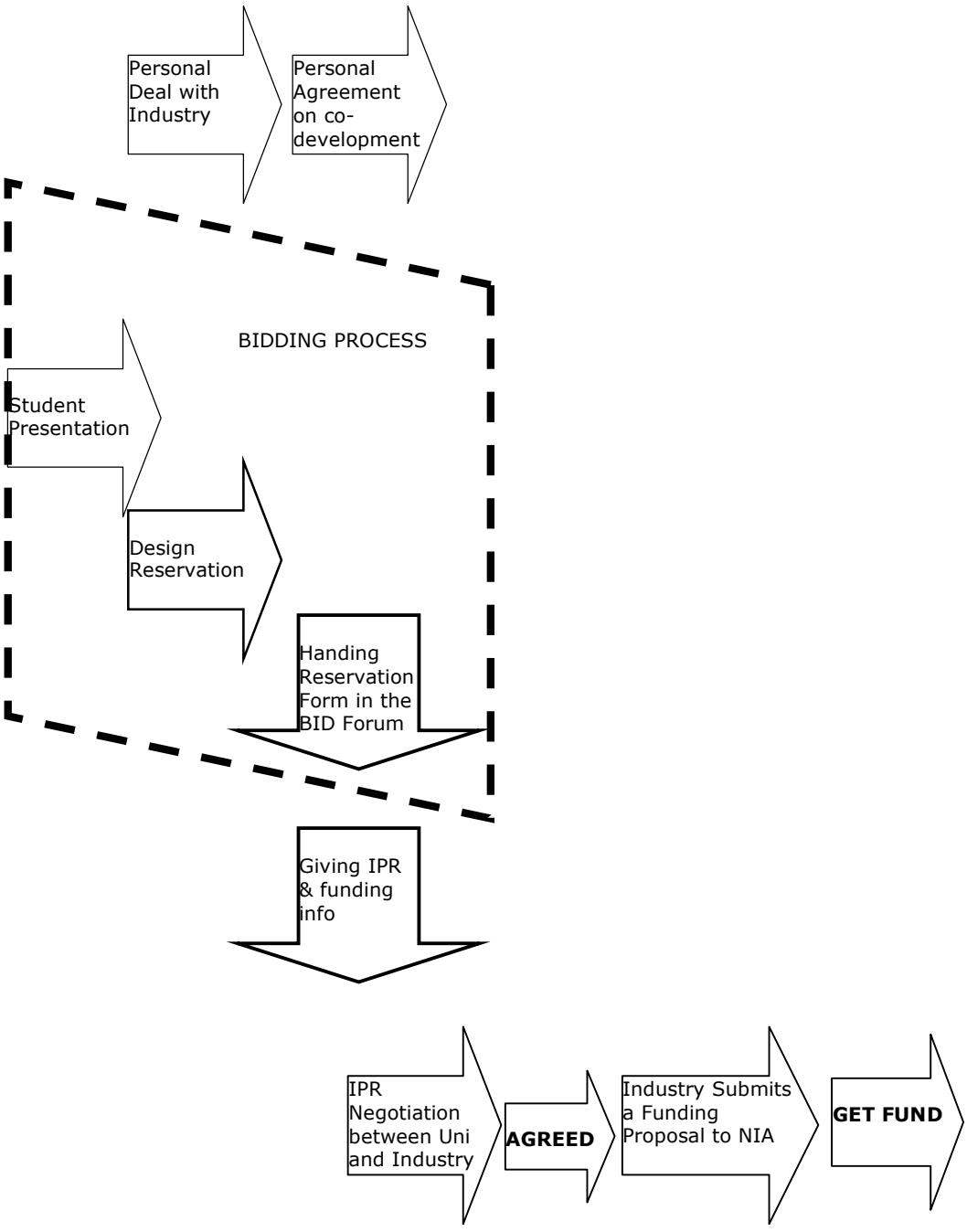

Figure 1: The Bidding Process in the BID Forum

Everybody participated in the BID forum had to be abided by the legal agreement, non-disclosure agreement between the Bid organiser and all participants through registration. The aim of the registration was mainly to protect new design graduates' intellectual design property rights and to

collect the participants' details for the forum database. After the registration, a specified, coloured name tag was given to each participant, which the organiser and new design graduates could identify the status of the participants, for instance business owners, designers, press and design academics. Also, each participant received an information pack inserting general Bid information, a questionnaire, bidding timetable and other materials related to design technical and financial supports.

Intellectual Property Management

Regarding the IPM, all of the intellectual property rights of the design graduates' projects are owned by their universities. Graduates are acknowledged as inventors or innovators of the design projects. Normally, universities are in charge of all payment of patenting costs, from registration fee to patent maintaining fee. Therefore, to transfer any design rights, industry needs to negotiate with the university. Figure 2 shows the IPM process in the BID initiative. As shown in Figure 2, the IPM process is detailed as the following stages:

Stage 1: IPR Registration

According to the University's IPR rules and regulations (based on the KMUTT), all of the design theses of the final year students' projects are the property of the University. It is highly recommended that all of design projects, before being presented in the BID Forum, should be registered for patents and/or design patents at the IPR office or Technology Licensing Office (TLO) of the university.

Stage 2: IPR Reservation

After the new design graduates presented their design works in the BID Forum, if industry is interested in further developing, manufacturing, and/or commercialising of students' design projects, it is highly recommended that industry should reserve students' design projects by filling-out a reservation form in the BID Forum. The signed reservation form is just a statement of interest, but not a legal contract. It is possible that one design would be able to be reserved by more than one bidder.

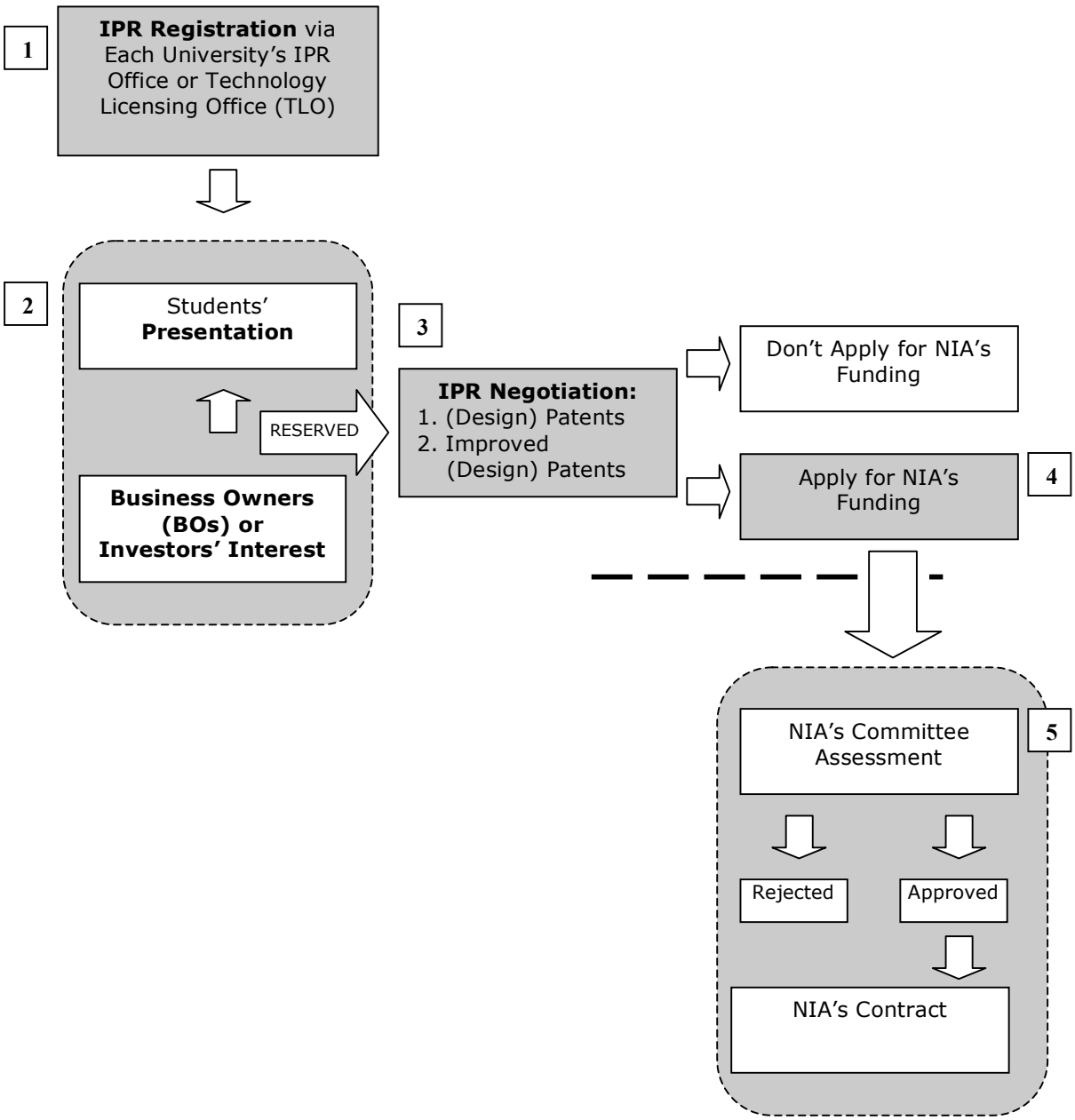

Figure 2: IPM process in the BID initiative

Stage 3: IPR Negotiation

To negotiate IPR, all bidders (in case of more than one bidder interested in the new graduate's design project) and the student will be invited by the university owning the project. The university is likely to explain two issues regarding IPR: (1) Initial IPR and (2) Improved IPR. As mentioned in the stage 1, first, the Initial IPR belongs to the University. As a result, the university will negotiate on how long and how to deal with the IPR to bidders (such as, selling

the whole IP rights or licensing them). The university should state clearly what benefits the student would get from the initial IPR. Secondly, in some design cases, the initial IPR will be further developed. The result of the further development of the initial IPR is called "improved IPR". The improved IPR should be agreed on its ownership by all related parties.

Stage 4: IPR Funding

If all related parties agree on the IPR in the BID Forum, the bidder can apply for the NIA's financial support, named 'Technology Capitalization', so as to support the further development of an innovative design. In this stage, the bidder requires to write a proposal to apply for the funding.

Stage 5: NIA's Funding

The Technology Capitalization funding is a free funding. As a result, NIA will not share the design rights. The selected NIA's committee will grant the funding. Requiring the funding through the BID forum, the following issues are likely to be added in the proposal:

- New design graduates should be part of the design development project.
- The design development project should be open to investigate by academic research.
- Design management academics should be employed as the project consultants in order to bridge the gap between design, education and business.

EXPECTED BID OUTCOMES

According to the BID objectives, it is a non-zero sum game. BID expects that all targeted participants will gain the benefits as the following:

First, it is expected that the initiative will help new design graduates to present their innovative product projects, to have a chance to further develop their design to market, to connect them with industry, to have a chance to be employed by industry and to build up networks with the rest participants.

Secondly, it will promote design education as an alternative source of innovation for industry and help design institutes to access a source of cooperative funding from the governmental agency. It is also an opportunity to raise income from the benefits of the patents and design patents to the department and university. In particular, it demonstrates the role of design management in the context of design study, business strategy and economy.

Next, regarding the governmental agency (NIA), the initiative will help to promote their supports on design innovation, especially from the development of design concept to commercialisation. It will also indirectly support the enhancement of the national innovation productivity. The BID forum helps to promote the innovation mechanism that the collaboration among design institute, industry and the governmental agency may initiate more innovative projects.

Finally, industry will gain access a source of new ideas for product/brand/business opportunities, learn and understand the benefits of industrial/product design, designers and design process which is able to add economic and commercial, access the intellectual and financial supports on design innovation investment and new design talents. The BID forum will allow business owners to generate more co-development projects.

UNEXPECTED RESULTS

According to the feedback from some participants and the author's experience in the BID initiative, there are the unexpected results as listed below:

Most of the participants from industry did not thoroughly understand the concept of the BID initiative, particularly the BID forum. The BID forum was totally different from the typical bid or auction. Designs/artefacts in the typical context are finished products. In the contrary, design projects in the Bid forum are products/systems which are in the initial design process. They need to be further developed. This constraint places a very difficult question how to encourage potential bidders to take design

projects on board. Industry did not also know on how to offer a right price for the design projects. There should have an initially suggested bidding price for each design project. Each design project should include information of marketing and business possibilities in order to stimulate decision-making process. Moreover, industry was more interested in a group of improved design projects which are close to the company's expertise and interest. Innovation design projects were less interested.

Before the BID forum, design graduates were trained on how to present their works. In the forum, a majority of them were unable to present their work professionally in order to convince industry to bid their design projects. Design graduates enjoyed building up networks among the graduates from different universities. They suggested that the forum provides a platform for them to share knowledge and learn from each other among different schools of thoughts in design.

LESSONS LEARNT

According to the first BID experience, the author draws the lessons learnt in the participation with each participant as the following:

Design Institute: The knowledge of intellectual property management and design management was not well established in industrial/product design studies. Academic-industry-governmental agency collaboration was seen as a new initiative model. Some of the participated institutes cast doubt on its practicality. The further development of students' design projects among design graduate, academic, industry and governmental agency was seen as a new concept.

Industry: Most of the industries did not know the cost of design. They could not estimate it. One project was bid in the forum. The bidding price was very low. This implied that design was seen as a low value in business practice. After the forum, there was no contact from the participated industry on the request in the development of the design projects.

New Design Graduates: New design graduates joining the forum came from four universities. Each university had a different approach in design. They had learnt design thinking, method and process from each other. They exchanged ideas, communicated and connected with each other. A few graduates were recruited by the industry. The design graduates lacked communication, presentation and negotiation skills for their design projects. In the other word, they did not know how to sell their projects to the industry. They presented their design to the industry in the forum like they presented them to their lecturers. Some of the design management knowledge, i.e. intellectual property rights and strategic design planning should be taught in the undergraduate design courses.

Governmental Agency: BID helps to demonstrate on how industrial/product design can contribute to innovation for new product/business opportunities. Without the initiative, design has not explicitly seen on the national innovation level. NIA has realised the potential of innovation by industrial/product design.

DESIGN MANAGEMENT RECOMMENDATION

The role of design management is very significant to both design innovation development and all of the networking participants. To achieve the design innovation development of the graduates' design projects, from design concept to a potential producible and marketable product, it needs a good strategic design direction and a well collaborative project planning. As all participants, design management is a critical point in the establishment of this design innovation network model. The role of design management is to mediate, negotiate and communicate the same objectives of the initiative to all participants with different methods and languages. This is because the participants have different mindsets. To interrelate them together in order to build up design innovation collaboration, it needs 'design-management' skills, not either management or design skills. Design management is simultaneously established itself in the design, design education and business context.

The BID initiative has demonstrated a significant role of design management in the particular context in Thailand. The initiative believes that if all of the networking participants understand and perform their roles in design innovation networks well, the living network will be established. Here are the recommendations for all participants to strengthen their design management capabilities in the network: New Design Graduates need to develop their knowledge and skills on strategic design planning which should be part of the undergraduate programs. Industrial/product design education should not only be focused on pure design training, but also design management training. Design management academics should develop a DM course module for the design education at the undergraduate level. The knowledge of design, such as design thinking design methods, design process should be transferred to industry; design is a cocktail, a combination of different ingredients. Industry should realise deign as a business opportunity. Design is investment for creation and innovation, not excessive expenses. Design Management expertise should be employed in order to bridge the gap among design, marketing and business. Regarding the governmental agency, funding supports should be granted not only for industry at the tangible design projects, but also for design institutes at the outset of the design projects. Innovation culture should be strongly promoted for all participants.

The 3rd BID (Bidding Innovation by Design) will be held during 22 – 24 May 2008. At this time, it invites all of the universities that have industrial/product design departments in Thailand to join. For more information, please visit www.arch.kmutt.ac.th/bid

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