The men who knew too much: Supplier involvement and resource development at LEGO

INTRODUCTION

Suppliers are increasingly important to the performance of a company (Kotabe et al., 2003; Gadde et al., 2010). One of the major reasons for this enhanced significance regards the contributions of suppliers to the innovation and product development operations of the buying firm (Handfield et al., 1999). A particular aspect of the joint efforts is concerned with early supplier involvement in these innovative activities (Dowlatshahi, 1998; Johnsen, 2009).

This paper deals with supplier involvement in the design and development of a new packaging system at the toy manufacturer LEGO. Over the years LEGO had adjusted their packaging lines to various external conditions, resulting in a complex global system that performed reasonably well, but was limited in scope. LEGO decided to prepare for the future by reconsidering their entire packaging philosophy. The ambition with the new packaging system was to reduce supply chain complexity by reorganisation of the packaging lines. In this reorganisation suppliers were involved from the outset of the development process.

Designing a new packaging system is a complex undertaking since packages and packaging are related to several other functions in an organization (Figure 1).

![Figure 1](image_url) The main interfaces of the packaging system (Regattieri & Santarelli, 2013:191).

Modifications of the packaging system must thus take the impact on internal functions such as production, logistics and marketing into consideration. For example, from a logistical point of view it is claimed that the package is more important than the product, “because it is the package that must be dealt with, and the product itself may be of secondary concern” (Ballou, 1987). Actors throughout the supply network are influenced by the packaging of a product and the packaging is a way to both adapt to diverse supply interfaces as well and managing their specific resource and
activity needs. Moreover, there is an important interplay with environmental concerns to take into account.

In this study the process of mobilizing and engaging suppliers in the joint development of the new packaging system is described and analysed. The paper begins with a literature review and the framing of the research problem. This section is followed by the case description of the process in the packaging project. The empirical findings are then discussed with regard to models and concepts presented in the framing of the study. The paper concludes with theoretical and managerial implications.

FRAMING THE RESEARCH PROBLEM

In the literature on innovation management, there is strong support to the notion of involving external actors to further product and process innovation. Concepts such as innovation networks, open innovation, innovative communities and distributed innovation all refer to an underlying notion of the benefits of acknowledging the value of external knowledge for innovation activities (Chesborough, 2005; Von Hippel, 2005). The value of external knowledge to further internal innovation process is not only recognized in theory, but is in some cases an integrated part of management practice. For example, in the MUJI concept stores, the best-selling products are developed by MUJI users (Nishikawa et al., 2013). Moreover, processes for organizing knowledge input from suppliers and other partners are part of Proctor & Gamble’s ‘connect and develop’ program for co-development of products (for an elaboration of P&G’s strategy, see Huston & Sakkab, 2006). The reasons for engaging external partners in these operations are expressed in the following way by P&G representatives: “99.99% of the smartest people in the world do not work for us”.

The framing of the research problem contains three subsections. The first deals with benefits and challenges related to involvement of suppliers. This is followed by discussions of organizational issues in buyer-supplier coordination and the associated consequences for learning by combining buyer-internal knowledge with external knowledge located in suppliers.

Benefits and challenges of supplier involvement

Several research contributions have increased the understanding of both the benefits and the challenges of involving suppliers in innovation activities (Handfield et al., 1999; Liker et al., 1996; Takeishi, 2001; Lakemond, Berggren & van Weele, 2006). Ragatz et al. (1997) point out three major advantages: reduced costs and improved quality, shortened product development time, and improved access to and application of technology. Particular benefits are associated with involving suppliers early in these processes, explained by the claim in Bonaccorsi and Lipparini (1994:144): “early involvement of suppliers in the innovative processes is one of the major aspects that contribute to a company’s performance”. In a similar vein, a comprehensive literature review concluded that there is “overwhelming evidence to suggest early and extensive supplier involvement as a key explanatory factor of superior new product performance in terms of cost, quality and time to market benefits” (Johnsen, 2009:193). A particular benefit of early involvement of suppliers is the opportunity to “enhance the information and expertise regarding new ideas and technology” (McIvor & Humphreys, 2004:180).
However, at the same time the involvement of suppliers represent substantial challenges. For example, Monckza & Trent (1997) identified two significant barriers in these efforts. The first concerned the resistance of both buyer and supplier to share proprietary information of relevance for the design operations. The second regarded the design culture in the buying company that made their representatives reluctant to share responsibility with suppliers in the design process. Another source of tension originates in the relations between suppliers. Bonaccorsi & Lipparini (1994) identified two significant issues in this respect: the timing of the involvement of suppliers and the degree of competition among them. McIvor & Humphreys (2004:193) illustrated the consequences of variety in these respects. In their study of early supplier involvement in the electronics industry they compared the effects “when the supplier is heavily involved and selected at the concept stage of the process” with other situations where “suppliers were being played off against each other so that the customer could extract the most favorable terms”. The impact of inter-supplier rivalry is addressed also by Andersen & Drejer (2009) who found that resistance and power issues influenced the contributions from supplier involvement considerably.

In order to capture the potential benefits and handle the associated challenges, organizational issues come to the fore. For example, Brown and Eisenhardt (1995) pointed out the significant impact on successful joint development from organizational arrangements in terms of team composition and team organization of work and group processes. Next, we therefore turn to the organizational arrangements in supplier involvement.

Organizational arrangements

A subset of this literature is particularly concerned with the organization of supplier involvement and its impact on performance. This literature draws on more general concepts from organization design and management theory. Petersen et al (2005) address what managerial practices affect team effectiveness (operationalized as design and financial performance) when suppliers are to be involved. In particular they are concerned with differences in terms of when in the innovation processes supplier most effectively can be involved and the types of activities that suppliers should be involved in. The authors provide and test a model of alternative supplier integration points. Based on the study, they conclude that managerial practices such as supplier selection and joint setting of technical and performance goals improve project team effectiveness, which in turn positively impact performance. Their study echoes previous findings from research dealing with success factors in inter-organizational collaboration (see Ragatz et al., 1997 for an overview).

Lakemond et al (2006) provide a typology of various forms of inter-organizational coordination of supplier involvement, and expect the efficiency of coordination regimes to be dependent on task dependence, divergence of supplier-manufacturer expectations and long-term collaborative objectives. The authors provide a typology of coordination modes including three distinct forms. The first, and most advanced, approach is labeled ‘project integration coordination’ representing an integrated way of working with suppliers where extensive information is exchanged on a more or less continuous basis. In this case a temporary inter-organizational team is formed around solving the task. The second, ‘direct ad hoc coordination’ mainly occurs on an incidental basis. This form of coordination is applied when problem occurs and the supplier can contribute to solve these problems, which means that supplier and buyer coordinate their work on an irregular basis. The third form is ‘disconnected sub-project coordination’, where teams in the buyer and supplier organization are assigned separate tasks and where coordination is minimized. Through detailed specifications from the buyer, the supplier takes on a more independent role, with only minor
support from the buyer. Generally speaking, the more novel and complex the task, the stronger organizational capacity to convey coordination is needed.

The main organizational issue in supplier involvement in product development concerns the particular problems related to integrate external supplier based knowledge and internal knowledge in the buying organization. In the organizing efforts managers of supplier involvement processes must take into consideration involvement barriers that are relationship-specific, supplier-related, and buyer-related (Wynstra et al., 2001). Problems related to suppliers may concern their capabilities and resources and the associated opportunities to contribute to the buyer’s development activities. A particular aspect of this problem occurs when the buyer’s requests conflict with those of other customers to the supplier. Relationship-specific problems may be rooted in insufficient communication of the actual goals and expectations of the buyer, for example concerning responsibilities and project plans. A lack of trust between the parties may hinder collaboration since risk and uncertainty feature complex projects. Finally, buyer-related problems in supplier involvement regard the practices for staffing the collaborative teams, dividing work according to various purposes and adequately dealing with the crossed incentive structures of the various departments.

We agree with this identification of organizational issues. However, we believe that the buying organization’s ability to combine internal and external knowledge deserves further attention. Previous research shows that the learning capability of organizations engaged in inter-organizational development differs strongly (Hamel, 1991; Kumar & Nti, 1998). These issues are not really researched in relation to supplier involvement. As we see it, the role expectations and strategic intentions of the actors in the buyer-supplier context pose specific challenging problems to supplier involvement that deserves further attention.

Combining internal and external knowledge

Organizations may be more or less able to absorb external knowledge from collaboration with suppliers, and this capability may hinge on several issues. Several streams of organizational research have pointed to these issues. Argyris & Schön (1978) explored the interplay between organizational resistance on the one hand and organizational ability to change on the other. Organizations are normally excellent at increasing productivity (bringing down costs or reducing failure) within a settled pattern of routines. This reflects what Argyris & Schön (1978) identified as Type 1 learning. However, organizations often fail with respect to questioning the appropriateness or effectiveness of the assumptions behind these routines (Type 2 learning in the framework). In a similar vein, Weick (1991) points out that organizations are best at stabilizing and routinely repeating predictable patterns of activities and produce outputs within a limited scope of variation. Reflecting that organizations focus on stabilizing and honing, Leonard-Barton (1992) coins the concept of core rigidities, which addresses the ongoing discussion of the myopia of learning (Levinthal & March, 1993). According to this notion, once organizations become good at something and have shaped internal incentives and identities around certain competences, they are very hard to alter, even if their ability to provide competitive advantages has waned.

The above conditions also have consequences for the organization’s ability to identify, valuate and utilize external knowledge, as has been suggested by researchers of the NIH (not-invented-here) syndrome (Katz & Allen, 1982). Lacking ability of bringing in new knowledge may well hinge on the degree to which existing practices has become ingrained and taken for granted in the organization. Moreover, the attitude, behavior and experience of dealing with knowledge residing
outside the firm’s ownership boundaries impact on the capability to innovate. In the context of redesigning organizational boundaries to open up for supplier inputs to innovation processes, Gadde (2013: 17) proposes that: “long-term focus on internal resources and operations reduce the interaction with other organizations, which restricts the firm’s scope for innovative redesign to what is achievable within its ownership boundary”.

Fundamentally, mature and often quite excellent organizations face an unlearning problem: one of breaking down existing assumptions in allowing for new ones to emerge from involving suppliers. Buyer-supplier relationships are intrinsically complex as they have been molded through a complex process of resource combining, where each input element from supplier has been fitted and re-fitted with the internal resources of the buying organization. With this process, beliefs and assumptions have become firmly institutionalized and much knowledge in relationships is implied. When beliefs are firmly vested and build on choices and knowledge which may not be part of the conscious memory of the company, organizational members ‘know too much’. To be able to assess knowledge that is distinctly different from their existing beliefs and the deepness of their vested beliefs is a challenge that must be addressed before new knowledge can emerge (competence traps). However, there is another side to ‘not invented here’. It has been suggested, that new knowledge not always infer improving existing practices, since including new knowledge is costly and the ramification of deploying new practices in one part of an organization can have unforeseen consequences elsewhere (Håkansson et al., 2009). Simply discarding prior beliefs through radical means of management may therefore not be a sensible option either. Manufacturers seeking deep involvement of suppliers early in development projects therefore must find ways to collaborate with suppliers that balance the need for posing new ideas that challenges existing beliefs but at the same time incorporate parts of these.

With these concepts in mind, this paper is focused on the interaction processes and dynamics of resource building by matching existing and new knowledge in supplier involvement projects. More specifically we want to investigate these processes of involving suppliers in the context of LEGO’s ongoing development of innovative packaging concepts.

**CASE STUDY**

**Data and methodology**

The LEGO case is a processual study which has unfolded over time. Rather than going through an ex ante selection process for finding a representative case, the packaging narrative was revealed during data collection on the management of creative processes in LEGO. However, given LEGO’s prominent position as highly admired company in the business community, which practices are imitated by others and the particular role of the packaging system as a critical resource for the company, we believe that this case provides an opportunity for learning that extends this particular case (Hagel & Brown, 2013). Data for the case was collected primarily through semi-structured interviews and site visits with managers presently and previously responsible for the packaging process and generous access to internal material offered by LEGO SYSTEM in Billund. The study started in 2008 and is still ongoing, and in addition to formal interviews there has been mail correspondence between managers and one of the authors. Furthermore, given LEGO’s prominence in the business press, much information is available about their business practices. Web searches on involved suppliers, newspaper clips and insights from general case studies on LEGO’s development
have been used as backdrop material. Interviews have been recorded and transcribed. In agreement with LEGO, for the sake of the ongoing supplier involvement process, the names of the suppliers involved have not been issued.

Project background

LEGO’s packaging system is a strategic resource for the company for two reasons. First, the boxes serve an important role for ensuring accuracy and speed in the production of a LEGO set. During the packaging process, bins open and close automatically, dropping precise numbers of bricks into each polypropylene bag. A machine weighs these bags to make sure their contents are correct. At the end of the process, packaging operators fold the boxes, add any necessary pieces and make sure that the machines haven’t made any mistakes. A LEGO box is also an integral part of the customer experience. LEGO boxes are of an outstanding quality and richly decorated. Consumers often use the boxes to keep the large and expensive LEGO kits together, in order to ensure a continued building and playing experience. Also for the retail level, the boxes are important, for example for showcasing LEGO in the stores. Moreover, the perceived quality of a LEGO building set is contingent on deliveries of complete sets which also put strong quality demands on the packaging system.

LEGO packages 37,000 assembly kits per hour. Over the years, LEGO had gradually added bits and pieces to their packaging system and even custom-tailored machines to make them perform according to LEGO’s changing demands. The result was a messy global packaging system of high complexity with many different generations of machinery, which had been retrofitted and developed over time. One example provided in figure one, which basically is pre-packaging machinery fitted with more modern scales. The system performed reasonably well, but was limited in scope – particular when fast production ramp-ups were necessary in order to catch up with escalating sales of a certain product item. Moreover, packaging lines were ageing as no new investments had been made in the packaging equipment for some time, due to an economic crisis. LEGO managed to make a turnaround, and as sales were growing considerably over the following years, significant investments in increased capacity were needed. For a brief period LEGO attempted to outsource a considerable part of their production to a contract manufacturer, based on packaging machinery owned by LEGO. However, LEGO learned the hard way that their demands were beyond the current industry standard and that considerable efforts were required to involve external actors in such projects.

The packaging system represents a strategic bottleneck for LEGO. Sales of toys are highly seasonal (80% of the retail store sales of LEGO are in December) and category sales are highly unpredictable. One important influencer is the merchandise sales related to their long-time collaborative relationships with the entertainment production companies Lucas Films and Warner Brothers. The market response following from the launch of new LEGO toy sets reflecting key themes from new Star Wars and Harry Potter adventure films puts a strain on the production capacity. Therefore, LEGO must be able to ramp up production fast from time to time to meet demand changes, which calls for standard packaging lines. At the same time, however, the packaging system must respond swiftly to changes, which calls for high degrees of flexibility and
postponement of production to the latest possible time in the year in order to predict toys sales accurately.

So far the LEGO packaging system had evolved in a piecemeal fashion, which had worked, but with considerable uncertainty and often leading to supply delays – much to the dismay of the large toy retailers, upon which LEGO particularly depends. The ambition of the project was to rethink the whole packaging philosophy and bring in new ideas from the outside and in these efforts LEGO sought for supplier inputs. The team decided that LEGO needed to find and engage suppliers willing and able to participate in an innovation contest for developing the new global packaging system vision. This ambition included the management challenge to translate the design problem from an internal to an external context. The dialogue with competent suppliers had to be moved beyond the beliefs within LEGO and possible generic solutions held by suppliers of packaging solutions. Central to this challenge was developing an arena for interaction, where prior beliefs could be challenged and where the combined knowledge of suppliers and LEGO was to be utilized in the search for new solutions. We believe that these conditions represent generic challenges pertaining to buyer-supplier collaborations among partners who “know too much” and must overcome this knowledge deficit in order to provide genuinely new solutions.

The packaging project

For the above reasons, the timing was right for LEGO to redesign their entire packaging system. The new packaging arrangement should reduce the complexity in the LEGO supply chain by bringing down the number and types of packaging lines considerably. From the beginning, the basic ideas were that creative inputs were needed from external suppliers, for the project to escape the existing way of thinking about these issues in LEGO. A project manager was appointed in the Concept Center Division in Billund, which oversees global supply chain issues in LEGO. The working title of the new project was: “Packaging Platform Final Pack” and the project manager reported to a steering committee which included senior people from top management, finance, sales, design and purchasing from the Billund organization. The initial job was to further mature the ideas already developed in LEGO and align the critical internal stakeholders’ expectations, visions and wants to a new packaging system. The vision of the new system was formulated in accordance with Table 1.

<table>
<thead>
<tr>
<th>Current features</th>
<th>Future features</th>
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<td>- Many lines</td>
<td>- On-line concept</td>
</tr>
<tr>
<td>- Many packaging constructions</td>
<td>- One box construction</td>
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<tr>
<td>- Separate automatic and manual packing platform</td>
<td>- One shared automatic and manual packing platform</td>
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**Table 1**: The basic modifications of the packaging system

The ultimate aim with the redesign of the packaging system was expressed in the project brief, which in short form stated:

*The project objectives are to develop a modular packaging platform, with maximum two automatic line sizes. It should encompass LEAN thinking, integrated, supporting production orders down to one hour and building*
The project brief thus stipulated the problem areas that the solution was to address, rather than a specification list and tendering procedure. Also, it was agreed from the start internally (and also communicated to the suppliers), that cost was an issue, but it did not rank among the top issues on which prospect suppliers would be evaluated. The project contained five phases: Research; Assessment; Develop & deliver; Co-evolve; Set-up & test.

The research and assessment phases

During the research phase, LEGO representatives visited several international technology fairs for packaging machinery in order to identify and meet with prospect suppliers. Moreover, they relied on their previous experience of potential suppliers’ capabilities in order to identify innovation partners. Several departments in LEGO were involved in these processes. The ‘packaging project group’ contained specialists representing marketing, product development and packaging. In addition to the steering committee other groups supported the work of the packaging project group. For example, there was a reference group, including key stakeholders such as plant managers. Other people with influence on the identification and selection of suppliers involved an engineering group, an architect group, and an equipment group. The ‘final pack core team’ consisted of a group of coordinators specialising in cross-functional arrangements.

The basic idea was to entice those suppliers, who would see the project as an interesting challenge to showcase and stretch their knowledge, but also to weed out those who would not be relevant or committed to the partnership. The project leader visited these suppliers, and made a brief presentation of the project scope. This part of the process was fairly open-ended and LEGO did not know exactly what they were looking for, but tried to keep an open mind.

The most important criteria applied in the evaluation of prospective suppliers are listed in Table 2.

<table>
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<tr>
<th>Vendor features</th>
<th>Solution features</th>
<th>Service features</th>
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<tr>
<td>Reputation</td>
<td>Technical parameters</td>
<td>Reaction time</td>
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<tr>
<td>Financial stability</td>
<td>Changeover time</td>
<td>Spare parts and after sales services</td>
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<td>Sub-suppliers</td>
<td>Capacity figure</td>
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<tr>
<td>Familiarity with LEGO</td>
<td>Lead time</td>
<td></td>
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<tr>
<td>Innovative and creative</td>
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<tr>
<td>Organizational stability</td>
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<tr>
<td>Turnkey experience</td>
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<tr>
<td>Capacity</td>
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<td>Lead time</td>
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Table 2: Vendor, Solution and Service features evaluated in the project.
The aim was to identify 10 suppliers, who were willing to participate. The project manager from LEGO soon learned, that explaining the project and to gain access beyond the sales personnel and to the supplier’s development resources represented a challenge in its own right. The suppliers’ sales managers frequently operated as gate keepers in the process and were less than willing to pass on the unconventional bidding material to their organization. However, after some time, the LEGO project manager found ways to present his case so that sales managers agreed to help him in contact with critical back-office resources in their organization, which could better evaluate and grasp the complexity of LEGO’s problem. Although the task was unknown to the suppliers and they were asked to stretch outside their normal routines, it was possible to find a sufficient number of suppliers who were willing to discuss the project further. LEGO ended up with seven suppliers who were interested in engaging in a further dialogue with the project team. Several of the suppliers that decided to participate described the project as an interesting experience, where learning could be attained from an industrial lead user. Suppliers were obviously also motivated by the fact, that a refurbishment of LEGO’s global packaging lines would mean an order in the neighborhood of 30-40 million Euro.

The develop & deliver phase

In the beginning of the “develop and deliver” phase, each of the suppliers individually visited LEGO in Billund to give the team an impression of their initial idea of how they planned to solve the task and based on this to exchange ideas and ask questions to the LEGO specialists involved. Two weeks prior to this initial visit, they had received the project brief and had got this time to prepare questions and formulate initial ideas. Based on these presentations, the LEGO packaging team selected the five suppliers (from France, Germany, Sweden, Denmark and Switzerland), they thought were the best prospects of becoming turnkey suppliers. They picked those who they sensed best understood LEGO’s ideas and vision, and which had the most doable plan for carrying out this vision in reality. They also graduated these suppliers, with respect to whether they were seen as system suppliers or suppliers to provide a critical module to the final solution.

Then the suppliers had a period of three months to develop and prepare their ideas, including several iterations with the project team. LEGO offered to reimburse their costs for this part of the project, but only one supplier took the offer, in accordance with the perceived learning experience. During the 3-month period, they should receive LEGO for an update visit and also prepare a visit for LEGO at a customer, who previously had bought a solution from the supplier. At the end of the
time period suppliers were to make a presentation at LEGO in Billund, showcasing their ideas for the final packaging team, who would function as a “casting jury”. In addition to these planned meetings, members of the team were in ongoing communication with the supplier organization and provided additional information in the form of supplements and briefs to the development teams. The final presentation was a bounded task, where they were to present a response to the project brief and to provide a calculation of the costs and setup time involved in producing the LEGO box they received.

The suppliers knew that other suppliers were working on the same project, but did not know their identity. However, two suppliers learned each other’s identities as one of them contacted the other to inquire whether they would be interested in functioning as a subcontractor. All five suppliers presented their ideas for the group and the steering committee over a period of two weeks. Each supplier had a full day for presenting their ideas and discussing these with the panel and was given feedback, based on this assessment.

### Postponement of final decision

Based on these presentations and their learning during the development and deliver phase, the LEGO final pack team realized that no single supplier’s solution would be able to satisfy their needs. However, they also concluded that the creative solutions of individual suppliers could be pieced together and comprise a truly novel packaging system. Therefore, the intention was to appoint one supplier among the pool of suppliers that in phase four was to co-develop and prototype this joint solution in collaboration with LEGO. Finally, in phase five, the solution was to be rolled out in the global LEGO production system, as the supply chain organization became convinced that the prototype was working. Managers from the internal production plants in Mexico and the Czech Republic and from the production plant in Hungary, which was still managed by the contract manufacturer, were asked to comment on the proposal.

However, in the end, the testing process never materialized due to internal disagreements in the LEGO steering committee, which had been changed three times owing to internal priority issues. There were several reasons behind this disagreement. The immediate cause was that the concept suggested was highly automated and extremely advanced and, consequently, very costly. Moreover, the new packaging system would create a lock-in situation for the strategic resource for a considerable period, with respect to capacity but also with respect to physical location of packaging activities. An even more deep-rooted cause was some uncertainty with respect to the future strategic boundary-setting between external and internal supply of packaging equipment and technologies. The system would also freeze resource interfaces with respect to the selection of suppliers of other critical materials for creating the LEGO cardboard box. For instance, an important feature of the perceived quality of the box with respect to durability and appearance is the locking mechanism. If the locking feature of the box does not work properly, users are likely to damage the box, which quickly gives it a worn look. The appropriate locking mechanism of the box varies with its size, and box size is one of the critical parameters in the presentation of LEGO in the toy stores. Thus, sunk cost investments in the packaging machinery would considerably freeze creative options in the marketing department.

A second aspect leading to uncertainty was the fact, that LEGO still considered outsourcing to external suppliers an important option that should be kept open, given the seasonal variation in the sales of LEGO toys. In addition, in 2009, LEGO took over the final production site in Hungary
from their contract manufacturer. Hence, in 2010, the internal team decided to postpone the
decision to buy new packaging equipment and instead focused on re-internalizing production and
stabilizing the production flow. This ended the first iteration of the LEGO packaging team. The
team was dissolved, but their work was still seen as valuable and useful in future developments.

The second iteration of the packaging project

In step with LEGOs continued success, the problems with the short production window continued
and intensified, and the search for a solution was therefore re-started in 2011. In this second
iteration, a new team was formed. This time, the team had a different mandate, since much
conceptual work had already been done and the new project should not be a fully automated
solution but rather include and build upon some of the existing pre-packaging machinery that had
been re-internalized by LEGO. Building on the experiences and concepts made by the previous
team concerning demands for flexibility, a new team re-started the search for a solution for the
strategic bottle-neck problem in the packing resource. The team was also organized in a different
way. Rather than being organizationally anchored in the Billund organization, with participation
from the senior members in the top management team of LEGO, this team was managed from the
Hungary plant, which was also used as the test site for building a pilot production line. The project
manager heading this new team had been involved with the contract manufacturer, but was hired in
to LEGO with the take-over of the Hungarian plant. He was asked to organize a new team, with the
purpose of building a new semi-automatic packaging line, which would both serve the intentions
formulated by the previous team but also build on the existing machinery and utilize LEGOs global
presence. The idea was that this new packing system, once in operation, would be rolled out to all
43 packaging lines in LEGO’s global packaging organization.

Instead of re-stating the previous organization, the manager involved the production managers from
the other global packaging sites directly in the team. Rather than taking other internal stakeholders
on board, he served as a liaison to stakeholders from quality, marketing and decoration departments
in the Billund Headquarters. He also contacted the German supplier suggested by the previous team.
However, when this supplier learned, that LEGO was backing down from their previous concept
and wanted to go for more manually oriented solutions, they withdrew from the project. Therefore,
the search for new supplier input began and the new manager also repeated the process of gaining
inputs and consent from internal stakeholders, organizing a workshop and visiting several of the
stakeholders to be involved. The production managers from the global production sites had only
been involved late in the previous project. Now they were among the first to comment on the
modified project and were keen to come up with ideas for building a semi-automatic production line
closer to the equipment they were already familiar with and the resource context they operated in.
Their suggestions revolved around solutions, which could utilize unskilled and temporary labor
more effectively than the old system. This became an important input for involving suppliers in the
new process. As the project for building the new system commenced based on the modified concept
descriptions, new suppliers were involved, but this time later in the process and with a strict
mandate to work with improving the existing system.

Some problems with incorporating the ideas and concepts for cardboard boxes which was part of
the previous team’s work remained. The previous team had developed a system of modular “white
boxes” in cardboard which was an important cornerstone in ensuring the flexibility of the more
automated system. The idea was that LEGO’s packaging flexibility could be greatly improved by
implementing a generic set of white unprinted boxes, which could be assembled into both smaller
and larger boxes and where decoration could be postponed to the latest time possible, when demand patterns were better known. In this way, LEGO could reduce lead times considerably.

However, for several reasons the semi-automatic system was unable to incorporate this idea across all box sizes. While this system worked well with the smaller boxes, the quality of the large signature boxes was unacceptable as they did not close properly or became bulky. In the end, and after much consideration, the new development team decided to challenge this notion from the original concept and confronted Headquarters in Billund. This turned out to be easier than first expected, since the particular constellation that had been behind the first packaging concept no longer existed. Most of the original members had moved on to other positions, had retired or left the company. Consequently, they were given a mandate to rethink this idea as well. With this mandate, they began an active search for a supplier of high-quality and re-useable large cardboard boxes and found a British supplier, which had developed a particular solution for a locking mechanism, while at the same time providing flexibility with respect to the surfaces to be used for decoration. LEGO also learned from this British supplier that they had considerable insight with respect to suggest changes to suppliers of packaging machinery. Based on their insights, the team managed to improve quality considerably. The manager of the LEGO packaging line team therefore decided to invite this supplier to take a more active and permanent role in the team that involved suppliers for the packaging machinery, together with the suppliers that currently provides packaging machines for the test line in Hungary.

At the moment, in April 2014, the production line is still not ready, but there are week-to-week improvements on the line and it is expected to be operational in the summer 2014. Shortly thereafter, the roll-out and ramp-up phases will commence and LEGO expects the system to be operational in, October-November 2014: in time for the 2014 high season.

DISCUSSION

The study of the LEGO process suggests some key learning points with respect to our understanding of the dynamics involved when developing new concepts and insights that challenges existing thinking around critical resources. In the following discussion we relate to the concepts presented in the framing of the research problem. We begin with the efforts to combine internal knowledge with external capabilities residing at suppliers. We continue by analyzing the organizational arrangements applied and end with a comparison of central features in the two iterations.

Problems in combining internal and external knowledge

The literature review indicated that firms may have problems with bringing in new knowledge within their organizations. Particular problems were supposed to occur in settings where existing practices are ingrained and taken for granted. These conditions showed to be at hand in the LEGO case where the packaging system is a critical resource, evolving through internal refinements over time. A characteristic of a resource’s criticality is that it has the attention of a broad group of internal stakeholders. It is well recognized in the change management literature and in managerial and consulting practice that an organizational truce often exists among these stakeholders. This truce is further re-installed and institutionalized through organizational routines and shared practices, which help stabilize and expedite daily organizational work. Much like an immune
system in the human body, this truce may automatically limit or even block managerial initiatives that involve organizational changes (Birkinshaw & Ridderstråle, 1999). These conditions were clearly visible in the case.

One reason for these tendencies of preserving things in their current trajectory is *knowing too much* - or at least being strongly convinced and conforming to the collective conviction in the organization or department that there are no relevant alternatives to the current practice. Often, managers reinforce the beliefs of each other through specific organizational actions to preserve status quo (Janis, 1971). Therefore, changing managers beliefs and perceptions from one path to the creation of a new one, requires removing them from existing practices. Major changes call for settings where normal hierarchical, normative and cognitive boundaries do not constrain thinking and learning processes.

Such alternative settings are referred to as liminal spaces (Wagner, Newell and Kay, 2012: 259). These authors studied the implementation of redesigned IT-system and concluded that a liminal space “provides a stabilizing platform whereupon the project team can develop new and potentially transformative information systems”. Liminality is temporal and restricted in time which makes Henfridson and Yoo (2013: 1) to identify these conditions as liminal periods rather than liminal settings. Liminal periods are “experienced by institutional entrepreneurs when they, unlike the rest of the organization, recognize limits in the present and seek to shift a familiar past into an unfamiliar and uncertain period”.

The LEGO project typically was a temporal assignment with a fixed deadline. The project aimed at identifying something novel and innovative that was assumed to replace current packaging arrangements. The project was complex and ambiguous – no single actor understood its full implications or knew where the project would lead at the end. These uncertainties were increased when the project unfolded and changed over time, partly because suppliers started collaborating, partly because of changes in the LEGO steering committee and partly because of the unforeseen changes in the context, such as the re-internalization of production equipment.

The whole idea of the packaging project features a strong element of liberation, as actors were expected to think freely beyond the organizational practices normally restraining them. In this way they were provided with both liminal space and a liminal period. The processes of exchanging insights and knowledge liberated both the members of the packaging project group and suppliers from thinking patterns bounded by their existing positions and functions. These conditions created a strong sense of unity among the group members and the selected suppliers. The team participants felt that they were effectively combining LEGO’s insights into the problematic issues of packaging flexibility with the insights from the supplier on packaging equipment. The collaborative efforts created bonds among the actors in the process and formed a community of practice around the project.

These conditions are in line with the findings of Wagner et al. (2012) regarding the transformation of IT-systems. They concluded that liminality offered a space that facilitated thinking outside the box, which helped team members to produce creative IT-solutions. In a similar vein, the LEGO packaging project participants believed that they were onto discovering a truly revolutionary way of re-thinking the LEGO pre-packaging process. Hence, it came as a big surprise to the members of this group that the LEGO top management was not ready to implement the concept, but instead stalled the entire project.
One of the reasons for the negative outcome of the first iteration was concerned with the strong community of practice around the project. The bonds created among the actors strengthened the relationships between those involved. At the same time they created a wedge in relation to the remainder of the LEGO organization. The same conditions appeared in the IT-transformation described above where the authors concluded that the liminal conditions negatively influenced the interaction between project members and the rest of the organization and the acceptance of the suggested solution at the time of implementation (Wagnet et al., 2012). Obviously, the organizational arrangements applied impact on the opportunities for combining external knowledge with internal capabilities.

The impact of organizational arrangements

The coordination of supplier involvement applied in this case is most in line with the ‘project integration coordination’ discussed by Lakemond et al. (2006:59). This approach implies that the supplier becomes “part of the product development project and carries out its tasks in close cooperation with the developing company”. Furthermore, the authors claim that this type of coordination requires a sufficient degree of common expectations among the project team members. Such common sets of expectations function as cornerstones for the commitment to the task, which is crucial for successful completion of the project. As shown in the case description these conditions were not to hand in the LEGO case, since no one actually knew where the project would lead. Another drawback for the outcome of the integrated coordination approach was that the competitive tendering procedure that was applied constrained the collaborative efforts in some way.

The case illustrated some of the barriers to supplier involvement identified by Wynstra et al. (2001). Concerning supplier-related barriers, insufficient communication was claimed to be a common problem. In this study the uncertainty and complexity of the project made it difficult for the buyer to express the overall objective of the project, which caused confusion on behalf of suppliers. When it comes to supplier-related barriers, the authors bring forward potential problems with the capabilities and other resources of suppliers. In the LEGO-case there were no barriers in this respect. On the contrary, suppliers were highly capable and represented the upper-end when it comes to the technological capabilities. Furthermore, from a technological point of view the redesign project was not highly advanced, and could be considered a ‘state-of-the-art project’ for suppliers.

On the buyer side, Wynstra et al. (2001) identified a potential barrier in the staffing of the project and the dividing of work among project members. In the first iteration of the project, production managers entered the project quite late which was a problem with respect to their attitudes and perceptions in relation to the new approach to design. This approach implied that the developed system was remote from the production management context in the global packaging organization. As explained by one of the managers interviewed, these conditions reflected the fact that the members of the first team were rooted in countries where advanced technology is commonly available and where unskilled labor is expensive and hard to come by. Thus, while increasing the internal effectiveness of the team with respect to knowledge sharing and joint development, bringing the project to the forefront of modern packaging technology, it had been less effective in its ability to maintain a strong link to the operational realities of the LEGO organization. Hence, the project seemingly lost the balance with respect to its ability to bridge new ideas with existing knowledge.
In these ways the outcome of the packaging project was similar to the claims by Wagner at al. (2012: 261) that the knowledge generation and sense-making that occurred among those sharing the liminal space “was not extended to the rest of the organization who will therefore remain rooted in the old practice”, which, in turn, sets the scene for active resistance. This means that the learning occurring within the main organization stayed at what Argyris and Schön (1978) identified as Type I-level, since established procedures and routines remained unquestioned. This also meant that supplier capabilities were not exploited in the first iteration which restricted the firm’s scope for innovative redesign to the resources available within the organization, in line with the proposition in Gadde (2013).

The relationship between the two iterations

The problems experienced in the first iteration impacted considerably on the organizational arrangements in the second iteration, which in turn affected the potential for combining internal and external knowledge. In the second iteration the project organization was moved from the LEGO headquarter to the Hungarian subsidiary. Moreover, the production organization was involved from the beginning. Both these changes supported the modified mandate of the project group to aim for a less revolutionary solution than the one planned for in the first iteration. In the first iteration the system developed was in fact novel and unseen in the LEGO packaging division. Therefore, the basic approach was changed in the restart of the packaging project. Rather than establishing a system on the basis of a completely new packaging philosophy, the objective of the second iteration was to build the foundation of the new solution on the existing system. In this way the gap between those engaged in the liminal space and those working in the established configuration was reduced. Therefore, the experiences related to the working system could be better taken into consideration in the redesign process. This means that where the first iteration had elements of a top-down process – moving from abstract conceptualizations created through innovation contests, visiting and gaming, the second iteration reflects a different and more grounded – or bottom-up oriented – approach. Whether the second iteration of the packaging development project will solve LEGO’s strategic bottleneck problem is too early to say.

Another aspect of the relationship between the first and second iteration concerns the transfer of knowledge and experience between the two teams. What was created by the ambitious efforts of the first team turned out to cause more problems than benefits for the second team. Both the entire LEGO organization and the world-class suppliers involved agreed that something truly novel had been created in terms of packaging solutions. However, the shadow of the challenges in the first period delayed important insights. The conceptual development inherited from the first iteration was something that the manager of the second iteration – with the benefit of hindsight – turned out to be a mental baggage that he would have liked to be without. The inability to transfer useful insights between the two iterations echoes previous research on the context situatedness of knowledge and that “knowing” is bounded in practice communities, and hence difficult to transfer (Feldman & Orlikowski, 2011).

CONCLUSIONS AND IMPLICATIONS

The study provides several learning points both with respect to research and with respect to managing the process of integrating supplier and buyer knowledge in projects related to the development of strategic resources. Beginning with the implications for managers, the case points
to an interesting challenge with respect to the integration of knowledge across organizational borders when ideas favoring liminality is applied for mobilizing challenging inputs from suppliers involved in process development tasks. As shown in the case study liminality is an approach to border-setting for inducing creativity in cross-corporate development teams. Successful liminality may lead actors astray on interesting paths through the forest of concepts and ideas. Sometimes concepts and development may take on a life of their own, which may solve a problem with respect to developing a strategic resource in a narrow sense. On the other hand these conditions may lead to outcomes that fail to take the larger context of that strategic resource into consideration.

These findings confirm the claim made by Orlikowski (2002) that knowing is contextual. Managers can liberate a development team by withdrawing it from the influence of a current setting which cast a long shadow into the present contextual problem. The team may present the problem in the abstract and then transfer it into a new setting and come up with novel definitions that would have been difficult to develop in the lieu of their ‘normal’ organization. The team can develop novel insights and in principle form their own shared mindset for how to understand and approach the problems identified. O’Mahoney & Bechky (2008), in a similar vein talked about the management of creative processes in organizational settings as one of creating mental boundaries around the creative team, rather than one of lifting existing mental boundaries. However, when freed from its contextual burden, the abstracted definition of a problem interacts with the problem solver’s knowledge. When the contextual constraints from the organizational ‘host’ are no longer present novel solutions are no longer challenged. Therefore, the outcome may be that the problem solving is not only liminal, but also marginal – in the sense that few of those for whom the problem solution was intended can recognize the problem again. For managers, this means that liminal projects – even if they include critical stakeholders, can be seduced by the lack of context and become ideal rather than pragmatic. Hence, although the voices from the host organization from which the problem origins can be a nuisance for developing new ideas, also leaving them out may cause problems by alienating problem solving.

For the sake of research, the case confirms findings from previous research that the issue related to integrating supplier and buyer knowledge is not a trivial matter. Therefore, further investigation is needed in order to better understand the process of transferring ideas and knowledge from one community to another. This transfer is crucial in both a time and a space context. In the time context the study challenged the common perception concerning the difficulties of transferring knowledge across projects since organizations lack memory (von Krogh, 1998; O’Dell & Grayson, 1998). In the LEGO-case the organizational memory showed to be well developed illustrated by the fact the problems experienced in the first iteration affected the second iteration negatively. Another challenge was that the company actually learned from what happened in the first iteration and adapted the organizational arrangements accordingly in the second iteration. Therefore these issues deserve further research.

References


