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Budgeting Patterns in Japanese Companies and Their Relationship with Exploration and Exploitation: An

Exploratory Study

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Abstract

to empirically classify the budgeting patterns This study aims (configurations) of general Japanese companies and present an exploratory description of the relationship between the patterns and organizational learning in terms of exploration and exploitation. Drawing on Sponem and Lambert's (2016) typology of budgeting in French companies, this research conducted a similar analysis utilizing the results of a questionnaire survey administered to companies listed on the First Section of the Tokyo Stock Exchange. According to the results, the budgeting practices of general Japanese companies can be classified into three patterns: flexible, strategic, and poor. These patterns differ from the characteristics of "Japanese-style" budgeting noted in the literature. Flexible budgeting resembles a combination of the features characteristic of the yardstick budget and the loose budget patterns presented by Sponem and Lambert (2016). Strategic budgeting is similar to Sponem and Lambert's (2016) interactive budget and poor budgeting are similar to what they term indicative budget. Sponem and Lambert's (2016) coercive budget, which fundamentally prioritizes posterior control, was not perceivable in the results. Furthermore, the results of the analysis on the relationship with organizational learning in terms of exploration and exploitation showed that of the three patterns, strategic budgeting displayed a pronounced tendency toward exploration.

Keywords

Budgeting patterns, Japanese-style budgeting, Management control systems, Exploration, Exploitation, Configurational approach

(1) Introduction

Despite budgeting being at the core of management control systems (MCS), it has been constantly subjected to criticism (Hansen et al., 2003; Lee et al., 2010). Nevertheless, most companies engage in budgeting and are aware that it has some effect (Libby and Lindsay, 2010). Furthermore, budgeting is now different than it was in the past because there has been an increase in the research that describes the influence of budgeting on organizational learning and innovation (Horii, 2015). In particular, recent studies have shown that budgeting is related to exploration and exploitation, which are two important types of organizational learning required to secure a competitive advantage (Bedford, 2015; Fukuda, 2015; Yoshida et al., 2015a).

However, the effectiveness of budgeting practices varies given their different characteristics and the multiple patterns (configurations) of combining them (Hansen and Van der Stede, 2004; Sponem and Lambert, 2016). Moreover, it claimed has been that Japanese companies practice a unique "Japanesestyle" of budgeting that differs from those of other countries (Lee et al., 2012).

Despite this, there is a lack of research that empirically examines the budgeting patterns of Japanese companies. Thus, such a classification would help to accurately describe the complex budgeting practices of such organizations. Furthermore, even though budgeting is related to organizational learning in terms of exploration and exploitation, the degree of such learning may differ according to the budgeting pattern.

Given the above discussion, this study poses the following research questions (RQs).

RQ1: How can the budgeting practices of general Japanese companies be classified empirically?

RQ2: How are such patterns related to organizational learning in terms of exploration and exploitation?

This study conducts an exploratory investigation of the above questions and presents a discussion based on the findings from a questionnaire survey administered to companies listed in the First Section of the Tokyo Stock Exchange.

(2) Literature Review

1. Budgeting patterns (configurations)

In recent years, research interest in MCS as packages of mutually related control practices has been increasing (Malmi and Brown, 2008). However, the types of patterns for control practice linkages in general companies remain unclear. Bedford and Malmi (2015) adopted a configurational approach to empirically examine the relationship between accounting and other control practices and, furthermore, the association of such combinations with context factors. ¹ Conducting a cluster analysis using the characteristics of 22 control practices as input variables, they derived a taxonomy of five control configurations and described the relationships with the context factors of technology, environment, and strategy. Two of the control configurations—action and hybrid control—differed from those in the literature.

Demonstrating the same understanding, Sponem and Lambert (2016) shed light on budgeting configuration. They empirically examined the association of various budgeting characteristics and their relationship with the role of, and satisfaction with, budgeting. They classified budgeting patterns using a cluster analysis with 11 budgeting characteristics as input variables. The results highlighted five

¹ Configuration refers to the specific multiple of arrangement parts. components, mechanisms, or attributes. The configurational approach refers to a strand of research that attempts to (1) understand MCS as а result of combinations of such diverse elements and (2) present the fundamental patterns. can be considered This approach consistent with an understanding of MCS as packages of mutually related control practices (Bedford and Malmi, 2015; Sponem and Lambert, 2016).

² Sponem and Lambert (2016) employs characteristics established in the literature, and they conceptualize the 11 characteristics on the basis of a focus budgeting patterns: yardstick, coercive, interactive, loose, and indicative. The following discussion summarizes the author's interpretation of these five characteristic patterns in terms of the degree of importance in prior, concurrent, and posterior control.² The reason for doing so is that many studies analyzing "Japanese-style" budgeting (e.g., Lee et al., 2012) use these categories.

First, the involvement of highlevel executives in senior management is necessary because a yardstick budget formation requires managerial participation. Furthermore, it can be inferred that emphasis is placed on prior and concurrent control because revision is rare. Second, among the patterns that exhibit a strong linkage of the budget with performance evaluation and rewards, a coercive budget generally

group for budgeting practices that comprises managerial accountants. They classify these characteristics into prior, concurrent, and posterior stages for control. In particular, the prior stage includes participation, type of negotiation, and difficulty of meeting budget targets. The concurrent stage consists of budget variance, budget revisions, and budget reforecasts. The posterior stage includes budget-based evaluations and rewards. Furthermore, involvement in budgeting, budget details, and degree of budget formalization are characteristics that span across the time scale.

places importance on posterior control, while an interactive one emphasizes prior and concurrent control through manager participation in budget formulation and senior management involvement in the budget process. However, target difficulty remains low and the degree of budgetary revision is average in the case of an interactive budget. Third, an interactive budget is similar to interactive control systems (ICS) (Simons, 1995) but differs owing to its strong linkage with rewards. Fourth, among the patterns demonstrating a weak link of the budget with performance evaluation and rewards, a loose budget warrants the participation of high-level management in the budget formulation, although the involvement of senior management in the budget process is low and the budget is subject to frequent revisions. As a result, emphasis is placed on prior control. Fifth, an indicative budget exhibits low levels of most budgeting characteristics; in other words, the budget is less likely to be considered for control purposes. Furthermore, while an interactive budget has the highest levels of satisfaction, an indicative one has low satisfaction levels.

While it is possible that the five patterns identified by Sponem and Lambert (2016) are characteristic of French companies, they may not necessarily apply to budgeting in Japanese companies. As described above, it has been claimed that Japanese companies practice a unique "Japanesestyle" of budgeting that differs from those of other countries (Lee et al., 2012).³

Furthermore, the relationship between the budgeting patterns and context factors remains unclear.

2. Japanese-style budgeting

This study will reference Lee et al. (2010, 2012) and recent field studies to present the characteristic aspects of this unique "Japanese-style" of budgeting in Japanese companies in the context of the three stages of control discussed earlier: prior, concurrent, and posterior.

There are three key arguments with regards to the prior control that is observed in the budgeting of Japanese Companies. First, participative budgeting in Japanese companies is said to possess a prior control function (Lee et al., 2012). Kishida's (2013) survey, for instance, showed a high degree of participation by both departmental managers and their subordinates in budgeting. Second, budgetary slack is considered to be low in Japanese (Ueno, 1997). In companies their comparative study, Lee et al. (2012) mainly examined this aspect in four

style management (Yoshida et al., 2012, pp.2-3). This study interprets the latter as "Japanese-style" budgeting and the analysis explores whether such practices exist.

³ "Japanese-style" management accounting implies management accounting originating in Japan or the practice of management accounting closely related to the organizational context of Japanese-

Japanese companies and discussed the systems used by each company to meet challenging targets. Third, as in the case of non-Japanese companies, the criticism of a weak linkage between strategy and budgeting targets (Hansen et al., 2003) may be valid for Japanese companies too. While Shimizu (2013) noted the value of linking a balanced scorecard (BSC) with the budget, few Japanese companies have been reported as implementing BSCs (Yoshida et al., 2012).

Next, in terms of concurrent control, first, it is possible that budget revisions, which are also practiced in several non-Japanese companies, are more common in Japanese companies. For instance, 20% of companies in Yokota et al.'s (2013) survey responded that "The initial budget is fixed and is not revised at all during the period".⁴ However, in Libby and Lindsay's (2010) survey on business units in North America, about half of the respondents reported that "Budgets are fixed. No changes made to them". Second, vertical interaction is common in the budget formulation of Japanese companies, implying that ICS budgeting is utilized as an (Kobayashi, 1990). Lee et al. (2012) also showed that interactions are common in concurrent control. Similarly, Kishida (2013) indicated that budgeting is more often used as an ICS than as a diagnostic control system.

As for posterior control, a weak link has been noted between performance evaluation and financial rewards in the budgeting practices of traditional Japanese companies (Asada, 1997). However, this tendency may change owing to the rise of pay-for-performance systems (Lee et al., 2010).

Nevertheless, it is difficult to argue that all Japanese companies possess similar budgetary characteristics. Furthermore, relationships are possible among the various characteristics. Thus, there is significant value in classifying the budgeting practices of Japanese companies.

3. Relationship with exploration and exploitation

When classifying the budgeting patterns of Japanese companies, differences in organizational contexts that align with such patterns are highly likely. This study focuses on two types of organizational learning—exploration and exploitation—as organizational contexts.⁵ Exploration and exploitation are concepts proposed by March (1991): the former refers to radical learning in

organizational learning, organizational learning is often understood as orientation toward organizational learning. This study adopts the same approach by focusing on organizational learning orientation.

⁴ However, approximately 70% of the companies reported "reviewing and revising, as required" on a regular or irregular basis; in other words, budget revisions were not necessarily carried out. ⁵ As Fukuda (2015) noted, in analyses on the relationship between MCS and

the pursuit of new knowledge and the latter is incremental learning based on utilizing existing knowledge.

This study focuses on exploration and exploitation for two reasons. First, there is an increase in research that describes the influence of budgeting and MCS on organizational learning and innovation. Horii (2015), for example, conducted both qualitative and quantitative studies to show the positive effects of setting challenging goals and fixing budgetary targets on organizational learning and product innovation. Second, the concept of organizational ambidexterity-wherein an organization simultaneously pursues exploration and exploitation-has become a key focus in organizational learning and innovation research (O'Reilly and Tushman, 2013; Yoshida et al., 2015a).

In recent years, there has been a growth in research showing the relationship of budgeting ⁶ with exploration and exploitation. Fukuda (2015) showed that operational divisions with an orientation toward exploratory learning tend to have higher perceptions of achieving budgetary targets and that the use of funds for ICS contributes to successful organizational learning. Bedford (2015) utilized Simons' (1995) framework to show the positive effect on performance by using: (1) ICS in companies oriented toward exploratory innovation; (2) diagnostic control systems in exploitative innovation-oriented companies; and (3) the simultaneous use of both in companies with tendencies toward organizational ambidexterity. Yoshida et al. (2015a) analyzed the influence of exploration and exploitation four Japanese-type on management accounting behaviors. The results indicated that the link between performance evaluation and reward increases with a rise in exploration orientation.

(3) Research Design1. Analysis method

The present analysis method, which is based on Bedford and Malmi (2015) and Sponem and Lambert (2016), is performed as follows. First, a cluster analysis was conducted to classify the budgeting patterns of Japanese companies. Each cluster was interpreted through an analysis of variance and multiple comparison procedures on the input variables. Similarly, an analysis of variance and multiple comparison procedures was performed to investigate the relationship of budgeting patterns with exploration and exploitation.

2. Data collection

The data were compiled using a questionnaire survey conducted by a research team, of which the author is a member. The purpose of the survey was to elucidate the current state of manage-

and exploration and exploitation, with budgeting included as a part of the MCS.

 $^{^{\}rm 6}$ Bedford (2015) and Fukuda (2015) analyzed the relationship between MCS

ment accounting, including budgeting and performance management. ⁷ On January 14, 2014, the survey was sent to 1,752 companies listed on the First Section of the Tokyo Stock Exchange with a response deadline of January 31, 2014. The number of respondent organizations was 247 (response rate: 14.1%).⁸

This study uses the survey results for two reasons. First, while the survey was not designed to investigate the research questions of this study in particular, it contains many items related to the characteristics of budgeting and performance management. Second, to empirically classify the budgeting practices of general Japanese companies, it seems appropriate to use a survey that targets all companies listed on the First Section of the Tokyo Stock Exchange, including many major traditional without industry-based companies, restrictions.

7 As will be discussed later. the questionnaire items for "Challenging performance targets" and "Performancereward link" are related to performance management characteristics. not budgeting characteristics. This is because the survey considers budgeting a core performance management technique (Yoshida et al., 2012, p.163).

⁸ See Yoshida et al. (2015b) for details on the survey method. As for the nonresponse bias, first, the results for the goodness-of-fit test showed that respondents' industry-type distribution conformed to the industry-type The following analysis employs data from 234 companies. Responses from 13 companies are excluded owing to missing values for questionnaire items.

3. Measurement of variables

This study measured variables related to budgetary characteristics utilized in the classification of Japanese companies' budgeting practices and those associated with exploration and Because there exploitation. is no established scale for both, the existing literature was consulted to the greatest extent possible.

First, an exploratory factor analysis was performed on the 12 items that were selected, based on Sponem and Lambert (2016), from the questionnaire items for budgeting characteristics. Two questionnaire items were not heavily loaded on any factor; however, they were still converted into the "No changes to

distribution of companies listed on the First Section of the Tokyo Stock Exchange (intermediate industry-type classification of the Securities Identification Code Committee). Second, in terms of the difference in organizational size (i.e., consolidated sales and consolidated of employees) number between respondents and non-respondents, only the manufacturing industry had a highly consolidated number of employees (Yoshida et al., 2015b, p.167). This implies the absence of any serious nonresponse bias.

budgetary targets" variable and the "Strategic budget formulation" variable and each was measured with a single questionnaire item. This is because they are related to important concepts that will be discussed in this section. A repeat analysis excluding these two items resulted in the extraction of three factors with eigenvalues of one or higher (Appendix Table 1). Items with high loadings for each factor were named "Degree of budgetary sophistication", "Interactive budgeting", and "Assignment of specific targets to individuals". In the operationalization of the variables, the average values of the items that were heavily loaded on each factor were used as scale scores.

Table	1.	Results	of	the	exp	loratory	factor	analysis	on	performance-reward lin	ık
							(n = 2)	34)			

Questionnaire Item	Mean	Std. Dev.	Performance- Reward Link
Business unit lower manager (subsection chief)	3.65	1.26	.95
Business unit middle manager (section chief level)	4.21	1.19	.93
Business unit regular employee	3.40	1.30	.83
Business unit director	4.68	1.36	.66

Note 1: A factor analysis was conducted using a principal factor method. Factor loadings of 0.4 and higher are rendered in bold.

Note 2: All questionnaire items in response to the question "To what degree is the financial reward of individuals with the following rank related to business performance?" were measured on a seven-point scale, ranging from 1 = "Not at all related" to 7 = "Very strongly related".

operationalize Next, to the performance "Challenging targets" variable, one item was selected and measured from the questionnaire items related to performance management. Then, to grasp the posterior control aspect, an exploratory factor analysis was performed the on same four questionnaire items as were used in Yoshida et al. (2015a). As shown in Table

1, only one factor—"Performance-reward link"—with an eigenvalue of one or greater was extracted, and its scale score was calculated as the average values of the four relevant questionnaire items.

Appendix Table 2 presents the variables related to budgeting characteristics used in this analysis as a result of the above. These somewhat correspond to Sponem and Lambert's (2016) constructs.⁹ The variables are associated with the characteristics of Japanese-style budgeting, as described above in terms of prior, concurrent, and posterior control. First, "Degree of budgetary sophistication", "Challenging performance targets", and "Strategic budget formulation" are related to participative budgeting, budgetary slack, and the link between strategy and budgetary targets, respectively. Second, "No changes to budgetary targets" and "Interactive budgeting" are related to and ICS. budget revision Third. "Allocation of specific targets to individuals" and "Performance-reward link" are related to posterior control characteristics. Since "Challenging performance targets", "Strategic budget formulation", and "No changes to budgetary targets" are each measured by a single questionnaire item, as noted above, their scales may be subject to validity 10reliability and issues. Cronbach's alpha values for the remaining items are 0.7 or greater, indicating no internal consistency problems.

Finally, exploratory factor an analysis based on He and Wong (2004) and using the same six questionnaire items as those in Yoshida et al. (2015a) was performed for exploration and exploitation. In Yoshida et al. (2015a), one questionnaire item did not load heavily on either factor. This item was excluded and the analysis was repeated. As shown in Appendix Table 3, two factors with eigenvalues of one or higher were extracted. As per the interpretation of the items with heavy factor loadings, the two factors were termed "Exploration" and "Exploitation". According to Yoshida et al. (2015a, p.56), items loading heavily on the former indicate a tendency to emphasize innovativeness and new markets and prioritize new technology, products, and services. On the other hand, those loading heavily on the latter denote a tendency toward kaizen and employees achieving multiple targets simultaneously. In the operationalization of the variables, the average values of the items that heavily loaded on each factor were used as the scale scores.¹¹ Both have Cronbach's alpha scores of 0.7 or

⁹ However, there are points of difference. For example, certain elements of the constructs relating to the degree of budgetary detail and the degree to which the budget is formalized are included in the "Degree of budgetary sophistication" and "Interactive budgeting". Furthermore, budget revision and budget as well as budget-based reforecast, evaluation and rewards, are not differentiated at a conceptual level.

¹⁰ In Sponem and Lambert (2016) too, budget revision was measured using a

single questionnaire item and, thus, it is highly likely that the scale is subject to reliability or validity issues.

¹¹ While Yoshida et al. (2015a) focused on the manufacturing industry, their method to measure the relationship of "Performance-reward link" with "Exploration" and "Exploitation" \mathbf{is} identical to that adopted in this study. This research still conducts an exploratory factor analysis because it expands the scope of analysis beyond the manufacturing industry to organizations

more, implying no internal consistency issues.

(4) Results

1. Budgeting patterns of Japanese companies

To classify the budgeting patterns of Japanese companies, a hierarchical cluster analysis was conducted using as input variables the seven budgetary characteristics measured above (Ward's method): "Degree of budgetary sophistication", "Challenging performance targets", "Strategic budget formulation", "No changes to budgetary targets", "Interactive budgeting", "Allocation of specific targets to individuals", and "Performance-reward link". The input variables were standardized for the analysis. Then, on the basis of the results' dendrogram, three final clusters were defined. ¹² Subsequently, a one-way analysis of variance and multiple comparison procedures (Tukey-Kramer method) were performed on the input variables. The results are presented in Appendix Table 4. The significance level for the statistical analyses was set at 5%.

Cluster one (C1) reported the lowest levels of "Challenging perfor-

mance targets" and "No changes in budgetary targets", indicating that nonchallenging and achievable performance targets are maintained and the initial budgetary targets are flexible. Thus, this cluster was named "Flexible budgeting". Furthermore, the values for the degree of budgetary sophistication and interactive budgeting were high, implying that prior and concurrent control is emphasized. Cluster two (C2) showed the highest values for all characteristics, except strategic budget formulation, implying that control is emphasized in all phases (pre, concurrent, and post). This cluster was termed "Strategic budgeting". In cluster three (C3), the values for most of the budgeting characteristics were lower than those of the first two clusters, suggesting that the budget is unlikely to be used for control purposes. This cluster named "Poor budgeting". was As Appendix Table 4 shows, 92 (39.3%) companies used flexible budgeting, 95 (40.6%) companies implemented strategic budgeting, and 47 (20.1%) companies reported poor budgeting. Furthermore, organizational size and industry type did not vary by cluster.¹³

followed by 34.94, with three clusters. Almost all the companies were in C1, rendering the cluster interpretation difficult. Thus, if two clusters were set, it was decided to include three clusters.

¹³ The results of the one-way analysis of variance for average consolidated sales (*F*-value (2,231) = .169, *p*-value = .845)

in the non-manufacturing industries. It is noteworthy that the analysis results are identical to those of Yoshida et al. (2015a). ¹² The pseudo F-statistic, which is the index used to determine the number of clusters in a hierarchical cluster analysis (Calinski and Harabasz, 1974), was highest at 39.50, with two clusters,

2. Relationship with exploration and exploitation

То elucidate the relationship the between budgeting patterns of Japanese companies and exploration and exploitation, the former was set as the independent variable and the latter two were the dependent variables. In addition, a one-way analysis of variance and multiple comparison procedures (Tukeyperformed. Kramer method) were Appendix Table 5 presents the results.

The analysis results showed a between the relationship budgeting patterns of Japanese companies and exploration and exploitation. The results of the multiple comparisons of the differences across all patterns indicated that poor budgeting had the lowest mean score for both exploration and exploitation and the differences with the other statistically patterns were significant. By contrast, strategic budgeting had the highest mean scores for exploration and exploitation, with a statistically significant difference in the mean scores of exploration when compared with flexible budgeting.

(5) Discussion

This section presents the implications of the results in the context of the two research questions posed in section (1).

To determine if the budgetary practices of general Japanese companies can be empirically classified, let us compare the results of this study with the patterns identified in Sponem and Lambert (2016) and re-examine the concept of "Japanese-style" budgeting.

First, flexible budgeting is a pattern resembling a combination of aspects that are characteristic of the vardstick and loose budget patterns presented in Sponem and Lambert (2016). Both patterns involve a high degree of managerial participation in budget formulation. Flexible budgeting, in particular, has a high degree of budgeting sophistication. However, it differs from the yardstick budget, which may not be subject to frequent revisions. Flexible budgeting also differs from the loose budget pattern, which may not emphasize interactive budgeting in the concurrent stage. In addition, the findings indicate a relatively weak performance-reward link, resembling the "Japanese-style" budgeting patterns with prior and concurrent control, as noted in Lee et al. (2012). Furthermore, frequent budgetary revisions imply that the budgetary targets are not challenging.

Second, strategic budgeting is similar to Sponem and Lambert's (2016)

of an independence test (chi-square test) $(\chi^2$ -value (62) = 73.456, *p*-value = .151) indicated no significant relationship with the clusters.

and average consolidated employee numbers (*F*-value (2,231) = .255, *p*-value = .775) revealed no statistical difference in organizational size between the clusters. As for industry type, the results

interactive budget and poor budgeting is similar to what the authors term an indicative budget. Strategic budgeting prioritizes not only prior and concurrent control but also posterior control, while loose budgeting may not be used for control purposes. Both differ from the of "Japanese-style" characteristics budgeting, as has been noted in the literature. Furthermore, the characteristics of strategic budgeting, where targets are fixed and relatively difficult, differ from those of an interactive budget, suggesting that challenging targets can be maintained.¹⁴

Finally, Sponem and Lambert's (2016)coercive budget. which fundamentally emphasizes posterior control, was not perceivable in the results. In fact, about 80% of the companies reported using flexible or strategic budgeting. Thus, it can be concluded that "Japanese-style" budgeting commonly prioritizes prior and concurrent control. Nevertheless, the two groups can be defined on the basis of the importance placed on "Allocation of specific targets to individuals" and "Performance-reward link" (i.e., whether posterior control is emphasized).

Next, a comparison of poor budgeting with the other budgeting patterns and of flexible budgeting with strategic budgeting will allow us to investigate how these patterns are related to organizational learning in terms of exploration and exploitation.

First, the mean scores for exploration and exploitation were significantly lower for poor budgeting than the other patterns. Under any of these organizational learning orientations, emphases on prior and concurrent budgetary control by creating refined budgets and both regular and irregular discussions will be effective.

Second, a comparison of flexible and strategic budgeting revealed a significantly higher mean score for exploration for the latter pattern. Previous studies have implied that certain budgeting characteristics can effectively increase exploration, such as maintaining challenging targets (Horii, 2015), using the budget as an ICS (Bedford, 2015), and strengthening the performance-reward link (Yoshida et al., 2015). In contrast to studies highlighting the influence of individual characteristics (Bedford, 2015; Horii, 2015; Yoshida et al., 2015), this study showed a relationship between exploration and the strategic budgeting pattern, which combines various characteristics. In terms of an interactive budget, Sponem and Lambert (2016) argue that by placing importance on prior and concurrent control, budgetperformance evaluation based and

¹⁴ However, as shown in Appendix Table 4, even though the scores are relatively higher than those for other patterns, it is notable that "Challenging performance

targets" and "No changes in budgetary targets" returned an average value of approximately four on a seven-point scale.

rewards as a form of posterior control can be appropriate. Thus, it can be said that Japanese companies using strategic budgeting maintain challenging targets, combine budgetary characteristics, and are oriented toward exploratory organizational learning.

(6) Conclusions

Drawing on Sponem and Lambert's (2016) typology of budgeting in French companies, this study conducted a similar analysis using the results of а questionnaire survey administered to companies listed on the First Section of the Tokyo Stock Exchange. According to the results, the budgeting practices of general Japanese companies can be classified into three patterns: flexible, strategic, and poor budgeting. These patterns differ from the characteristics of "Japanese-style" budgeting noted in the literature. Furthermore, the results on the relationship with organizational learning in terms of exploration and exploitation showed that of the three patterns, strategic budgeting displayed a particular tendency toward exploration.

Despite its contributions, this study is not free from limitations.

First, despite referencing the extant literature, the budgeting characteristic variables used in the cluster analysis may be subject to reliability or validity issues. In particular, it is necessary to develop a scale with higher levels of reliability and validity for the constructs "Challenging performance targets", "Strategic budget formulation", and "No changes in budgetary targets".

Second, given the differences in the abovementioned budgeting characteristic variables and other aspects, the method adopted in this study was not the same as that used in Sponem and Lambert (2016). Thus, it is possible that the analysis results are attributable to context differences between Japan and France or to the use of different analytical methods. Future research should consider conducting an international comparative study using the same methods.

Third, the relationship between the budgeting patterns of Japanese companies and organizational learning in terms of exploration and exploitation can be considered as an implied relationship. An in-depth analysis is, therefore, necessary to examine the relationships with other context factors such as technology, environment, and strategy.

Finally, to classify the budgeting patterns of general Japanese companies, an analysis targeting all companies listed on the First Section of the Tokyo Stock Exchange (including many traditional major companies) without industry-based restrictions was considered appropriate. As discussed in Section (4), no difference was found across organizational size and industry for the three patterns. However, it is possible that the results could differ if the analysis focused on small- and medium-sized enterprises or industries in rapidly changing environments.

Future studies might consider limiting their analyses to specific organizational scales or industries.

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			Degree of		Assignment of
Questionnaire Item	Maan		Budgetary	Interactive	Specific
Questionnaire item	mean	Stu. Dev.	Sophisticatio	Budgeting	Targets to
			n		Individuals
Processes and procedures related to budget and operations are clear	5.31	1.19	.87	12	07
Budgetary plans (e.g., sales, profit, and cost price [costs]) are set to a finely detailed level	5.34	1.13	.84	11	.00
Middle managers are sufficiently involved in the process of setting budgetary targets	5.19	1.30	.64	.21	.04
Middle managers are sufficiently involved in the process of setting business targets	5.19	1.28	.57	.10	07
Business plans (e.g., delivery date, specifications, and quality [new product development	4 9 9	1.05	50	0.9	1.9
and sales]) are set to a finely detailed level	4.38	1.20	.92	.20	.15
When initial budgetary targets and actual results diverge, upper management of the	5 99	1.90	- 19	1.05	- 00
business unit and middle managers engage in discussions	5.52	1.20	.12	1.05	.00
Upper management of the business unit receives regular reports on the budget	5.94	1.90	0.2	94	- 08
implementation process and has regular discussions with middle managers	5.34	.54 1.29	.03	.04	08
Implementation plans are continuously revised to enable responses to situation changes	4.93	1.34	.18	.46	.06
Specific business targets are assigned to individuals	4.34	1.54	01	.00	.97
Specific budgetary targets are assigned to individuals	3.84	1.70	05	05	.70
	Degree of	Budgetary	1		
	Sophis	stication	I		
Factor Correlation	Interactiv	e Budgeting	.57	1	
	Assignmen	nt of Specific	45	9.9	1
	Targets to Individuals		.40	.00	1

Appendix Table 1. Results of the exploratory factor analysis on budgeting characteristics (n = 234)

Note 1: A factor analysis was conducted using a principal factor method with promax rotation. Factor loadings of 0.4 and higher are rendered in bold.

Note 2: There was a marginal difference in the questionnaire for the manufacturing and non-manufacturing industries. The items specific to non-manufacturing industries are presented in square brackets.

	No. of Questionnaire Items	Minimum	Maximum	Mean	Std. Dev.	Cronbach's a
Degree of budgetary sophistication	5	2	7	5.08	.97	.85
Challenging performance targets	1	1	7	3.55	1.39	N/A
Strategic budget formulation	1	1	7	3.82	1.40	N/A
No changes to budgetary targets	1	1	7	3.51	1.80	N/A
Interactive budgeting	3	2	7	5.20	1.13	.83
Allocation of specific targets to individuals	2	1	7	4.09	1.47	.74
Performance-reward link	4	1	7	3.98	1.12	.90

Appendix Table 2. Descriptive statistics for budgeting characteristic variables (n = 234)

Note: For "Challenging performance targets" and "No changes to budgetary targets", participants were asked to respond to the statements "Performance targets are set at a challenging level that cannot be easily achieved" and "Initial budgetary targets are not changed, regardless of changes in the situation". Their responses were measured on a seven-point scale, ranging from 1 = "Not at all" to 7 = "Totally". For "Strategic budget formulation", respondents were asked "How is the budget formulated?" Their responses were measured on a seven-point scale, ranging from 1 = "The budget is formulated by adding an amount for new ventures to the previous year's results" to 7 = "Resources are selectively allocated from a strategic viewpoint to achieve management strategy".

Questionnaire Item	Mean	Std. Dev.	Exploration	Exploitation
Employees are encouraged to act innovatively and not be risk	1 19	1 49	Q1	01
averse	4.12	1.42	.01	.01
Importance is placed on new market entry and breaking new	3 75	1.20	61	- 05
ground	0.70	1.00	.01	.00
Development of new technologies and products [new products and	1 11	1.24	60	06
services] is prioritized in resource allocation	4.11	1.04	.00	.00
Kaizen activity is conducted on a daily basis/continuously	4.74	1.23	.01	.79
Employees are independently oriented toward the simultaneous				
achievement of multiple targets, such as cost price [costs], quality,	4.33	1.11	01	.77
and functionality				
		oration	1	
Factor Correlation	Explo	itation	.52	1
Cronbach's α			.71	.75

Annondiv Table 2 Da	guilta of the explanator	y factor analyzic on or	nlanation and an	rnlaitatian (n - 921)
Appendix rable 5. Re-	suits of the explorator	y factor analysis on ex	pioration and ex	pionation ($(\Pi - 204)$

Note 1: A factor analysis was conducted using a principal factor method with promax rotation. Factor loadings of 0.4 and higher are rendered in bold.

Note 2: There was a marginal difference in the questionnaire items for manufacturing and non-manufacturing industries. The items specific to non-manufacturing industries are presented in square brackets.

Note 3: The questionnaire items were measured on a seven-point scale, ranging from 1 = "Not at all" to 7 = "Totally".

Note 4: "Importance placed on increasing satisfaction levels of existing customers rather than new customers" did not load heavily on either factor and, thus, was excluded from the analysis.

	C1	C2	C3	A	ANOVA	MCP
	Flexible Budgeting	Strategic Budgeting	Poor Budgeting	F-Stat.	Significance	(Tukey-Kramer Method)
Degree of budgetary sophistication	5.23	5.54	<u>3.88</u>	79.66	.000	C2 > C1 > C3
Challenging performance targets	3.20	3.95	3.45	7.39	.001	C2 > C1
Strategic budget formulation	4.09	3.99	<u>2.96</u>	12.46	.000	C1, C2 > C3
No changes to budgetary targets	2.87	4.01	3.77	10.79	.000	C2, C3 > C1
Interactive budgeting	5.46	5.62	3.82	70.59	.000	C2, C1 > C3
Allocation of specific targets to individuals	3.23	5.35	<u>3.22</u>	116.32	.000	C2 > C1, C3
Performance-reward link	3.91	4.34	3.41	11.9	.000	C2 > C1 > C3
n	92	95	47			

Appendix Table 4. Results of the analysis on Japanese companies' budgeting patterns

Note: The lowest values are underlined and the highest are rendered in bold.

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(n = 234)								
	01	Co	C 2		MCP			
	Flexible Budgeting	52 Strategic Budgeting	C3 Poor Budgeting	F-Stat.	Significance	(Tukey- Kramer Method)		
Exploration	3.95	4.34	<u>3.38</u>	13.77	.000	C2 > C1 > C3		
Exploitation	4.56	4.87	<u>3.81</u>	18.20	.000	C2, C1 > C3		

Appendix Table 5. Results of the analysis on relationship with exploration and exploitation

Note: The lowest values are underlined and the highest are rendered in bold.

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A Conceptual Framework for Responsible Innovation

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Abstract

This paper proposes a framework to assist firms in achieving sustainable and responsible innovation in their research and innovation processes. It unravels how Japanese firms (such as Shiseido, Toyota, Rakuten etc.) have successfully takes into account of effects and potential impacts on the environment and society when accelerating their product innovation and services. For example, Nintendo Inc., a world leading Japanese consumer electronics and video game company, is one of the most influential in the industry for its reputation in corporate social responsibility (CSR) and rapid innovation. The ability of Japanese firms to launch new products in rapid succession over short periods of time is worth worldwide attention, as this could inform the next generation of innovation. In this paper, we discuss the framework that sets out the cornerstones for responsible product innovation.

Keywords

Accelerated Innovation, Creativity, Responsible, Low Cost, Corporate Social Responsibility

(1) Introduction

The term Responsible Innovation (RI) or Responsible Research and Innovation' is an emerging language for science and society, especially in the UK, Europe and in the USA. The most widely cited definition of RI is of Rene von Schomberg (2011), who defines RI as Responsible Research and Innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)". In a nutshell, the idea of responsible innovation is to engage public participation early into the research and product development process and embed the process with a sound scientific and technological risk assessment approach (Stilgoe et al, 2013). So far, RI stirs great expectations, hence requires tighter scrutiny (Nerlich & McLeod, 2016). Practitioners and academics need an easy to interpret framework to better understand and interpret RI in practice.

Nonetheless, the concept of RI is not entirely novel. Eco-innovation has been widely implemented in Japan in 80s. Japanese products, with strong synthesis of aesthetic, harmony and function is well suited to maintaining humanity, environmental friendly and connection in a technology driven world (Yamada, 2008). For example, Nintendo Inc., a world leading Japanese consumer electronics and video game company, is one of the most influential in the industry for its reputation in corporate social responsibility (CSR) and rapid innovation (Nintendo, 2018). The ability of Japanese firms to launch new products in rapid succession over short periods of time is worth worldwide attention, as this could inform the next generation of innovation, especially RI.

This paper aims to unravel how Japanese firms have successfully takes into account of effects and potential impacts on the environment and society when accelerating their product innovation. Drawing on literature as well as best practices from various firms, in this paper, we propose a framework that sets out the cornerstones for responsible product innovation.

(2) Towards a Conceptual Framework for Responsible Innovation

There is no shortage of terms for innovation i.e. incremental innovation (Proctor et al., 2004), disruptive innovation (Tan & Perrons, 2009), radical innovation, open innovation (Tan et al. 2015), serial innovation (Chung and Tan, 2017), serial innovation (Chung and Tan, 2017), and accelerated innovation (Li and Tan, 2017), and accelerated innovation (Tan & Zhan, 2016). In the OECD Oslo Manual (2005), innovation is categorised into four types i.e. product innovation, process innovation, organisational innovation, and marketing innovation. Based on a long-term study of innovation and creativity management in Japan, Xu and Nash (2013) argue that innovation can be structured into four dimensions i.e. product innovation, process innovation, business innovation, and social innovation. The four dimensions proposed by Xu and Nash (2013) are overlapped with the OECD Oslo manual. Especially, the organisational and marketing innovation dimension of the OECD (2005) is grouped under the business innovation dimension in the Xu and Nash's work.

In sustainable term, all innovations may be categorised into eco-innovation, green innovation or responsible innovation. In this section, we adapt Xu and Nash (2013) four innovation structure as the theoretical arguments that underpin our framework on responsible innovation. We do acknowledge (i.e. stakeholders governments, NGOs. community actors, employees) play a significant role in responsible innovation because frequent meaningful interactions between firms and stakeholders can influence the economic, environmental, and social activities. We then linking the proposed framework with the responsible innovation concept. We use examples and good practices of existing Japanese firms to discuss how the framework may add to the current discourse and management on responsible innovation.

1. Product Innovation

Product innovation is not just about improvement of functions, quality or esthetics. Product innovation should also take into account factors from various levels ranging from social ecology, society, to individual. A good example is Shiseido, one of the leading hair care firms in Japan. The firm produces many well-known products that make people happy through beauty (Shiseido, 2018). Shiseido also supports women empowerment in its business operations and respects diverse beauty. Though most products are 'designed' in Japan, the firm strongly promote ethical supply chain and recycling of resources (see Table 1). The whole process from sourcing, manufacturing, logistics, selling, and recycling is well thought out for each and every product in Shiseido.

Product	Social	Society	Individual
innovation	ecology		
Shiseido	Ethical	Women	Makes
	supply	empowe	people
	chain,	rment,	happy
	resources	respect	through
	recycling	diverse	beauty
		beauty	

Table 1: Product Innovation

2. Process Innovation

A process innovation normally involve new production or methods. Toyota is a world famous process innovation firm. Toyota Production System aka Lean Manufacturing is being actively adopted by governments, universities, NGOs, and firms worldwide to improve their product or service operations. Through process innovation, Toyota enables cars to be manufactured in high quality, exceeding safety requirements, yet at an affordable price for consumers (Toyota, 2018). The 7 waste concept also helps to educate managers to take a wider view on their operations from sourcing of raw materials to product end of life recycling potential (see Table 2). Toyota production system respect individual worker and pursuing sustainable operations in very processes. For example, the karakuri is an automated mechanism to reduce workers' stress and labour. The approach is suitable for most assembly operations and it relies on gravity and simple mechanism. hence eliminates energy consumption in production.

Table 2: Process Innovation Process Social Society Individual innovation ecology Toyota Recycling Initiatives Respect based for traffic for society safety individual and systems

3. Business Innovation

At the corporate strategy level, business innovation aims to create value for firms. It typically involves a business model to offer (or bundle) existing products or services to customers but at a higher value. Especially with the advent of internet and technology, many firms are able to 'disrupt' incumbent players through business innovation. A new business model can open up novel ways to generate revenue as well as adding values to consumers through integrating services, new solutions, and unique customer experiences. For example, using e-commerce, Rakuten allows consumers to shop from home, a service offering that provides much convenient to millions of shoppers. All purchases through Rakuten are protected and sometime shoppers may enjoy more 'perks' (i.e. extended guarantee, longer refund date etc.) than buying from a physical store (see Table 3).

Table 3: Business Innovation

Business	Social	Society	Individual
innovation	ecology		
Rakuten	Social	Latest	Individual
	entrepren	technol	purchase
	eur	ogy to	protection
	program	address	
		local	
		issues	

By using latest technology, Rakuten also initiated projects with communities to address local issues (Rakuten, 2018). With its specific knowledge and vast IT resources, Rakuten works with local entrepreneurs to grow their businesses and help to promote social harmony.

4. Social Innovation

As the name implying, social innovation involves changes (new technology or business schemes) that have an impact on society. A good example of social innovation is by Nintendo, one of the world's largest video game companies. Its mission is not just fun and entertainment for everyone, but also "Bringing Smiles to Future Generations" (Nintendo, 2018). To ensure that products are safe for everyone, especially young children, Nintendo has established its own design safety standards for product development. Game ratings systems enable individual to select games that are suitable and acceptable to them. Moreover, Nintendo's products also has integrated parental controls for parents to allowing family members to enjoy games with peace of mind (see Table 4).

Social	Social	Society	Individual
innovation	ecology		
Nintendo	Strict	Incorpor	Game
	content	ating	ratings
	guidelines,	games	systems for
	games	into	target age
	comply	school	range,
	local	lessons	Integrated
	regulation	to	parental
	s and	enhance	controls
	cultures	learning	

Table 4: Social Innovation

Nintendo also utilized its unique strengths of hardware-software integrated development and its characters, beloved across generations, to incorporate games into school lessons (Nintendo, 2018). Nintendo achieves social innovation by taking advantage of its accumulated experience and ability to create enjoyable experiences that keep consumers coming back for more (Nintendo, 2018). For example, the Wii Family Version allows whole family members to enjoy entertainment together and to improve social bonding. Its mission is bringing smiles to the community.

Based on the four innovation structure, Table 5 shows the proposed responsible innovation framework.

The proposed framework was developed based on the belief that we can collectively engage with the social, environmental, political and ethical dimension of responsible innovation. The goal of the framework is to provide guidance for practitioners, academics, policy makers to make research and innovation more inclusive and responsive. In line with Xu and Nash (2013), we view the four types of innovation as the structure of responsible innovation, but it is not one after another. Some cases may have commenced by business innovation, and some by social innovation, product innovation or process innovation. Hence, the steps are not neatly sequential stages, but that there is considerable iteration between steps. Table 5 shows circulating arrows to indicate iteration.

Table 5: An Iterative Process in the Responsible Innovation Framework

	Social	Society	Individual
	ecology		
Product			
innovation			
Process			
innovation			
Business			
innovation			
Social			
innovation			

The framework enables managers to understand the extent to which a firm embraces moral, environmental, social, and governance factors into its innovation, and ultimately the impact these factors have on the firm and society.

(3) Case example

In this section, we will use a test case (Toyota) to illustrate the application of the proposed framework. As one of the world largest automakers, Toyota constantly facing great pressure by its stakeholders (government, communities, NGOs, consumers, and employees) to response towards their need for a better product, environment and society. In another words, Toyota constantly enduring obligations throughout the entire process of a car manufacturing from idea generation until the disposal stage. The purpose of the case is to show how Toyota can collectively engage with the social, environmental, political and ethical dimension of responsible innovation.

	Social ecology	Society	Individual	
Product innovation	Smart mobility	Ethical supply chain	Fun to drive and zero casualties	
Process innovation*	Recycling based society and system	Initiatives for traffic safety	Respect for individual	
Business innovation	Enriching life of communities	Personal devices and self-driving technology.	High quality and environmental performance car for stress free driving	
Social innovation	Contribute to local communities and reduced economic inequality	Distribute income to local people	Income and job security	

Table 6: To	vota's Respon	sible Innov	ation Frame	work Example
T able 0, 10	your a recepch	SIDIC HHIOV	amon i raino	work Lixample

*See section 2.2 for Process innovation dimension

Corporate Social Responsibility (CSR) is core to Toyota in staying ahead of competitors and maintaining its position and reputation in the automotive industry (Toyota, 2018). The key is to balance its profits and the welfare of the society, consumers, and environment. The Kaizen philosophy is one of the Toyota core values that underpin product innovation. Designing a car that is fun to drive and at the same time to achieve zero casualties are two important objectives that Toyota committed fully. Toyota constantly continuously developing new safety technologies (i.e. Toyota Safety Sense), and improving on existing ones to cover more and more products in the Toyota lineup (Beatty, 2018). Thoughout the product development stages, Toyota maintain a genuine commitment to social responsibility and ethical business practices. In the long term, Toyota will meet the challenging goal of smart mobility by innovating vehicle technology to realize comfortable, convenient lifestyles that offer people peace of mind (Toyota Global, 2018).

In Toyota, CSR activities are implemented throughout the course of daily operations based on its corporate philosophy. Hence, Toyota is able to integrate product and process innovation into business innovation to generate revenue as well as adding values to consumers through integrating services and solutions. For example, Prius, a low emission Toyota model using full hybrid powertrain technology is a high environment performance car. It provides highly environmentally educated and conscious consumers a stress free driving experience. Toyota also capitalizes on its superior competences in product and process innovation to develop commercial viable self-driving cars (Pham, 2018). Ultimately, one of Toyota's visions is to contribute to the safest, most responsible ways of transporting people and to enriching the lives of communities around the world (Toyota, 2018).

Today, Toyota also giving a large proportion of its profits back to local communities to achieve a healthier environment and reduce economic inequality (Toyota, 2018). In order to contribute to the society, Toyota has involved in various environmental and social innovation activities, including philanthropy. community relations. and diversity and inclusion (Mazzoni, 2014). Besides creating job opportunities for local communities through its global operations, Toyota also utilizes its global know-how to help nonprofits do more for the communities. This is a win-win social innovation strategy as it not only creates value in the communities, but Toyota also learn from people they partner with and bring learnings back into its business (Mazzoni, 2014).

All in all, this simple test case illustrates the feasibility of using the proposed framework to capture the essence of responsible innovation in Toyota. The proposed framework can underpin a practical and systematic approach for firms to better understand and support the governance of responsible innovation.

(4) Discussion and conclusion

Responsible innovation has a strong moral basis. In other words, innovations should happen in an ethical and democratic way while staying economic competitive during times of great socio-economic challenges (Nerlich & McLeod, 2016). The proposed framework (see Table 5) captures the essence of responsible innovation. The framework provides an umbrella linking various aspects of the relationship between products/innovation and society, public engagement, gender equality, ethics, and governance. The framework we developed is not the 'silver bullet' for responsible innovation. Traditionally, managers are too preoccupied with the product of innovation. The framework seeks to shape a constructive engagement between questions of innovations and responsibility, and allows managers to science, collectively embed social. ethic. governance, and equality early in the innovation process.

Clearly, researches about RI will become more prominent in the future because science and innovation have become very complicated at the global level and need to be addressed collectively. Science and technology, which was the focus of firms have lost the potential to create responsible innovation. Japan had learned to broaden the concept of innovation to encompass policy that lead to encompass the social sphere i.e. social ecology, society and individual. We have shown Japanese companies developed innovative and social responsible products through merging and integration of different technologies/science and business models. The inclusion of stakeholders inside and outside the companies, enables responsible innovation to occur at record speed.

Although, the concept of RI is straightforward and convincing, to put into practice firms need to be prepared to make changes in several operations strategy

dimensions (structural, infrastructural, cultural). Far too frequently innovation and engagement with the wider communities is carried out relatively informally. A formal framework provides a mechanism for mitigating this tendency by allowing managers/researchers to decompose the complexity of RI into manageable steps. Managers had different mental models of how their organisations, products and services operated, and might therefore make different opinions on the possible RI strategies. The Toyota illustrative case (Table 6) indicates that the framework is feasible and can be applied to undertake responsible innovation analysis systematically. It enables managers to explore innovation dimension and sustainability in depth while concurrently maintaining a visual and transparent trail, enhancing the rigour of the processes. The framework allows managers to visualise the RI dimensions and relationships with stakeholders. The framework provides a formal tool for iterative group discussion, where managers learn and modifying their understanding of RI, ideas, beliefs and even their thought processes over time. Application of the framework can provide a number of insights into aspects of RI which add to academic understanding and could form the basis of further work.

(5) Limitations and future directions

We have argued how the proposed framework can facilitate the generation and communication of RI. One limitation is that the framework is based on the discourse of literature and best practices and have not been empirically tested. The other obvious limitation is that the economic aspect of responsible innovation has not been included in the framework. We hope this paper will stimulate additional theory building and conceptual development within the RI discipline. Future research to test the RI framework against reality should be carried out. In addition, a process to operationalise the framework is needed in order for practitioners and academics to utilise the framework effectively. Thus, a set of questions as well as steps to apply the framework should be developed.

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Design protection in managing sustainable user-driven

innovation in SMEs

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Abstract

Innovative products and services – which are an essential precondition to economic prosperity and welfare in society as such – result increasingly from cross-sectorial combination of technologies, design and business models. The recent design "wave" in management and innovation gained growing attention in the context of entrepreneurship and innovation. In recent decades, design became also part of the discourse of social responsibility. Designers interpreted their social role as complementarity to business strategies, and design was meant to bridge pure industrial thinking and social responsibility. Today, design adopts a comprehensive holistic thinking and addresses social, cultural, environmental, political and economic provinces in the context of globalisation, industrial expansion, increasing consumption.

Numerous approaches came to light under design management or design-driven innovation provinces. Indeed, they have been a promising key to develop, perform competitively and grow in a sustainable way. Yet, sustainable and responsible innovation development and the outputs thereof on the product, service or marketing level embrace also issues that are linked to the ownership and stakeholders involved in the innovation process, namely, intellectual property right (IPR) aspects – in both national and international contexts.

From an IPR perspective, it has to be taken into account that design-driven innovation is becoming a more and more prominent example of user-driven innovation, resulting in the challenge of how to distribute to prosumeristic users a "fair share" of the company's profit based on the economic exploitation of the prosumer's contribution. Indeed, industrial design issue here is just as significant as in patents or utility models.

The authors took part in several European research projects on design management, open innovation and related IPR topics with a focus on transnational entrepreneurship. The research is based on semi-structured interviews, qualitative and quantitative surveys, expert assessments from diverse European countries as well as on a comparative analysis of the legal national and international regulations on the issue. The paper highlights and discusses results of important aspects of IPR for design management processes, thus forging innovation and sustainable entrepreneurial growth.

Keywords

Design management, IPR, open innovation, user-driven innovation, SMEs

(1) Introduction

Design-driven innovation enjoys growing importance on the entrepreneurial agenda and cases like "Braun" products of Dieter Rams that inspired Apple's designers or the Russian "Gopniki" look. But most approaches and concepts for design-driven innovations are oriented on large-scale i.e. realistic companies, and feasible management concepts of design-driven innovation for entrepreneurs and specific SME-suitable implementation concepts are hardly to find. This makes it complicated for SMEs to benefit from design-related cost saving, business processes' improvements and sustainability, which have been proven by research studies (GDC, 2010; Gerlitz & Prause, 2017). Indeed, traditionally design has been affiliated with products and their uses, their shapes, colours, etc. or just been treated as a matter of mere styling but today, however, design has been "repositioned", and new possibilities were opened up for design to play: within manufacturing, business development, industrial and social innovation and, recently, digital and responsible economy domains (Hack et al., 2013; Inglewood & Young, 2014; Morelli, 2007).

Design is used not just for manufacturing any longer, but also for daily life. It acts as a driving force on the entire manufacturing process and the entire lifecycle. Design affects the entire ecosystem and leaves positive ecological, environmental, sustainable imprints, e.g. in the manufacturing sector, enables to generate technological innovations or achieve social inclusion through being heart within social innovation development process (Brown & Wyatt, 2010). Indeed, as the scholarly discourses showcase, design has become an important tool related to the business development. innovation and entrepreneurship (Borja de Mozota, 1998, 2003a, 2003b, 2006; Raulik et al., 2008; Prause & Thurner, 2014). By echoing Zhao (2005)an interplay of organizational (cultural), social (external environmental), managerial (entrepreneurial), technological and environmental domains that integrate design can drive innovation, accelerate new knowledge and experience generation. Therefore, the focus turns from traditional design towards design management (DM), i.e. the efficient and feasible collaboration between design and business in the SME context, leading to innovation (Norman & Verganti, 2014). Innovation is the key to both competitiveness and growth (Borja de Mozota, 2011). Consequently, DM is rather placed within the area of strategic management where network dimensions play a crucial rule, connecting and intertwining dimensions that affect SME performance in the regional context.

But today, innovation is increasingly complex, fast, interactive, and requires the connection of external and internal knowledge bases (Pavitt, 1984; Chesbrough, 2003; Asheim & Gertler, 2005; Malerba, 2005; Prause & Thurner, 2014). Consequently, firms acquire knowledge from a variety of sources and actors at various spatial scales (Smith. 2000; Tödtling et al., 2006). combining it with internal knowledge and competences. For this purpose, firms may maintain and use different types of interactions and transfer channels (Gilsing et al., 2011). Localized design expertise is crucial for competitiveness as innovation processes rely on the interplay between local and complementary global knowledge and design expertise (Gertler & Levitte, 2005; Boschma & Ter Wal, 2007). Thus, globalisation and emergence of global networks, new social and environmental challenges have jeopardised innovation and growth opportunities. This is especially true for the SME sector and performance of individual regions of the EU. Certain EU regions located outside the core of industrial activity or being more remoted from metropolitan areas are subject to a fiercer competition from other economically strong regions or global players. SMEs are regarded as a backbone and vehicle of regional and national economy. Thus, in order to strengthen regions that are exposed to competition more than the other, there is needed support for SMEs. They play crucial role in generating growth, attracting new investments and businesses, enabling clusters to evolve and ensuring employability of regional people (EC, 2012a, 2013a, 2013b, 2013c, 2015, 2017; GII, 2018).

Since product design plays an important role for the company's business success, the questions arise how to protect intellectual property rights as well as safeguard that unique product design that is distributed and used globally. Unfortunately, protection of design is not unique organised globally. Furthermore, there exists huge difference compared to patents that are applicable all around the world. In the EU member states, one needs just to pay a fee and other formal requirements meet for registration (e.g. Community design at EUIPO, Germany, France, Spain). Another approach appears for the Member States of the World Intellectual Property Organisation (WIPO), where a registration of product design within the WIPO protects the design in line with an examination by the designated Member States as well as in accordance with the Geneva Act of the Hague Agreement (DPA, 2017).

Protection of product design can be located in the context of Responsible Research and Innovation (RRI), which is the most recent and mainstream discourse in the EU (EC, 2012b, 2013d). RRI can be considered as part of a set of ideas and initiatives addressing socially responsible innovation. It describes research and innovation processes taking into account effects and potential impact on the environment and society. This approach is part of the European Research Agenda and has been integrated into EU programmes and projects. Until now, a large number of EU projects have been funded by the European Commission in order to develop the RRI governance framework (Res-AGorA, 2014).

By accessing protection of product design from the IPR point of view, the questions appear often in the context of open source and user-driven innovation. It is because of the open distribution of forms and their products in the globalised economy.

(2) Theoretical background

Traditional manufacturing SMEs are forced to search for new innovative and sustainable solutions in order to survive on the macro-regional or global scale. It might be argued here that in order to better equip for the global competition, local and regional needs and challenges need to be tackled first, before proceeding to the global scale. Generating innovation and focusing on the local and regional context needs to be focused on in order to make a stronger use of the "glocalisation". This term refers to addressed local and regional needs and challenges instead of concentrating on global integration (Courchene, 1995; Porter, 2000; Wolfe, 2002). Here, Design Management (DM) concept can help SMEs to strive and achieve innovation as well as to better adopt to globalisation. This might happen by developing new ways of making and selling products, services, adopting organisational processes and implementing visions that are in line with the needs and challenges of the local and regional setting (Candi, 2006; Steffen, 2010; Figurska, 2014).

Despite increasing trends of DM utilisation within the global scale and in large organisations, DM theoretical contributions and practical applications within the SMEs context is rather scarce (Hack et al., 2012, 2013; Gerlitz & Prause, 2017). Screening of the worldwide databases, DM concepts for SMEs yield just a few entries (Gerlitz, 2018). Parallel, DM is marginally utilised in SMEs and entrepreneurial management practices. Existing DM concepts appear to either to be absent or distant from their feasibility in SMEs (EC, 2009, 2013; Prause et al., 2012). Existing approaches and models are rather driven by transfer of best practices from large companies, which made them less feasible for SMEs. \mathbf{as} they were detached from considering the environmental ecosystem of SMEs, addressing less their specific needs and challenges, SMEs performance practices and networking interactions (Gerlitz et al., 2016; Gerlitz, 2018; Gerlitz & Prause, 2017). Consequently, there is missing a conceptual DM approach to innovation in SMEs from the processual perspective: how to employ tools, what challenges and opportunities are related to the DM embeddedness process and how does management of design integration take place. Furthermore, knowledge is missing on organisational changes that are based on opportunity recognition, innovation, organisational strategy and culture (Gerlitz, 2018). In addition, we deal here with nonutilised potential of DM: design integration and utilisation. This appear to be especially true for the SME context as well as in policy and governance domains and measures that would enable to decrease the gap in knowledge and research on what processes and frameworks may be adopted by enterprises to assist them in becoming design-oriented. As noted by Whicher & Walters (2014), only a few regions in Europe have integrated design into their regional or macro-regional innovation policy on regional and local policy levels (p. 4). Thus, practical application of DM concepts through research projects is demanded (Acklin et al., 2006).

New dynamics in the interaction of innovation, entrepreneurship, DM and regional development appear with the rise of the smart specialisation and the Industry 4.0 concepts (Gerlitz, 2016; Prause, 2014). Both approaches embrace distributed networking interaction and allow acquisition of knowledge and expertise from a variety of different sources. Especially, for the design sector, an inspiration and use of global patterns, icons, forms or ornaments together with the protection of their intellectual rights becomes crucial for competitiveness and the prospect of a company. The no-universal "design patent" as a global form of legal protection of design until now made first steps toward patenting industrial design right in some countries and institutions. On the European level, there are forms of registering design for both the WIPO members and several countries all around the world (DPA, 2017).

Special forms of exchange of design patterns is related to open and user driven processes that are organised by online communities. Following Bartl (2008), these processes are covered by an open innovation approach, which underscores the way of going beyond the corporate boundaries, i.e. an active strategic deployment of environmental cloud or external factors of influence to increase its own innovation potential (Hack et al., 2012, 2013). As a result, innovation occurs and ideas and design are generated in such a society through the interactive creation of value. Additionally, open innovation encompasses such manifestations as to be open for the knowledge of the other, generation of the knowledge as a joint action

as well as the share of the knowledge with the other. Here, again the already mentioned cases for open design driven innovation like Braun products of Dieter Rams or the Russian "Gopniki" fashion look underpins the importance of the flow of design innovations innovation and online among open communities around the world. But there should be a legal framework for these considerable transfers of value, providing sustainability and a minimum of balance of interests of both users and companies. Legal practitioners should familiarise themselves with user-driven innovation business models and the implemented technologies (Kerikmäe et al., 2018).

From a legal point of view, there is little demand for a balance of interest to be achieved by instruments of intellectual property law, as free use of otherwise protected rights forms the essence of the "Open Source Scene's Spirit". This means that all parties involved in open source innovation are aware that they - expressly or impliedly waive their respective IP rights, driven by the awareness that they jointly improve a "common good". But not all open or userinduced innovations contribute to public goods. The innovation beneficiary more and more often happens to be a private and profitoriented company, making the private user providing innovation not any more to a public good, but to private assets of that company, e.g. the photography of an amateur carpenter's design cupboard creation on Instagram, which is then found and copied by a furniture company (see further examples at Baldwin et al. 2006). The value generated by this innovation is not any more freely

available on the market, but has to be purchased by each buyer (or other kind of customer) individually. In this situation, the exchange of interest is not as balanced as in the "Open Source Scene", and correction measures imposed by law may be required. As these contributions are of immaterial character, these correction measures – in other words forms of legal protection – must be sought among the existing protection schemes intellectual property.

On the European level, the question of protection of product design falls into the area of RRI, which refers to the comprehensive approach of proceeding in research and innovation in ways that allow all stakeholders that are involved in the processes of research and innovation at an early stage (A) to obtain relevant knowledge on the consequences of the outcomes of their actions and on the range of options open to them and (B) to effectively evaluate both outcomes and options in terms of societal needs and moral values and (C) to use these considerations (under A and B) as functional requirements for design and development of new research, products and services (EC, 2012b, 2013d). A framework of RRI consisted of six key points and is described by the European Union highlighting engagement, gender equality, science education, open access, ethics and governance. As a result, RRI can be defined as "a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products in order to allow a proper embedding of scientific and

technological advances in our society (Schomberg, 2013). The first steps on the EU level have been scientifically narrowed down by Owen et al. (2012) to the three key points of democratic governance, responsiveness and framing of responsibility, which are to large extent overlapping with the EU framework. In addition, Stilgoe et al. (2013) highlight as main features for RRI the four dimensions of reflexivity. anticipation. inclusion and responsiveness. Thus, meanwhile the RRI approach found their way into the strategic documents and objectives of the Europe 2020 Strategy to create Smart Growth or into the Horizon 2020 programmes and related projects of the European Union, including the Res-AGorA project (Res-AGorA, 2014).

(3) Methods

The research process described in the paper followed a manifold research path. Diverse research methods have been intertwined, considering respective research approach and research tool. Five techniques were employed in exploring the objectives of the present paper:

- Research types: analytical, qualitative, historical, empirical, practice-based;
- Research approach: qualitative;
- Research methods: descriptive and qualitative – case studies, semistructured interviews, expert assessments and observations; and
- Research scope: different research activities between 2013 and 2018.

The reasoning behind the selection of the following techniques in the research process is elaborated in the following.

With regard to the research types, the

paper has chosen analytical, qualitative, empirical and practice-based way, since during the research process the facts and empirical evidence gathered were appropriately analysed and subject to a critical assessment. The core of the research process is the qualitative research approach. Important insight views were given in qualitative expert interviews and the analysis of case studies (Hack et al., 2012, 2013; Prause & Thurner, 2014; Hoffmann & Prause, 2015; Gerlitz & Prause, 2017).

(4) Design protection schemes in user-driven innovation

1. International design protection

Protection of designs is globally not yet harmonised, as it is e.g. already in case for patents, which can be effective all around the world. In contrast to other industrial property rights, protection is granted not only upon registration, but also - similar to copyrights by making design available to the public, despite the fact that the scope and period of protection is lower for these unregistered designs. Both design protection forms share anyway some common protection criteria: It can either protect the design of a flat surface, e.g. of a textile or wallpaper, or the design of a three-dimensional object. In this context, the following features as lines, contours, colours, shape, texture or the materials of a product play a crucial role. Here, a product is any industrial or handicraft item, including packaging, get-up, graphic symbols and typographic typefaces as well as parts intended to be assembled into a complex product.

A design must be new on the date of

filing in the application (respectively on that date, where a first alleged infringement has taken place in case of non-registered designs). This means that no design that is identical or differing only in immaterial details from the design in question has been published, exhibited or put on the market in any other way before that respective date. Furthermore, a design must have individual character, thus meaning that its overall impression must differ from already existing designs. In this context, neither the view of a layman nor the opinion of a product designer is decisive. It is rather an overall impression produced by the design on the so-called "informed user" that is relevant.

These criteria are covered by the national design protection law in terms of the following contents that are generally harmonised: The U.S. design patent, for instance, is a form of legal protection granted to the ornamental design of a functional item, e.g. jewellery, furniture, beverage containers or logos. Providing another example, the German registered designs protect the appearance of industrially manufactured or manually crafted products, e.g., clothes, furniture, vehicles, fabrics, decorative objects or graphical symbols. Parts of products can also be protected by a registered design, for example, the sole of a sports shoe or the cap of a writing instrument. Under the German law, a registered design (German: "Eingetragenes Design"), formerly called "Geschmacksmuster" (in English, "aesthetic model"), is a form of intellectual property that extends industrial design rights over the visual design of objects that is not purely utilitarian. The term of a "Geschmacksmuster" is twenty-five years (§

27 (2) GeschmMG) old. It is used for the Community design (Bulling et al., 2004; Eichmann & Kühne, 2015; GPA, 2017).

general. In international design follows principle protection the of territoriality, i.e. design rights are granted by and under the legal systems of individual states. Thus, their protection is generally restricted to the territory of the state that is granting the design right. As a result, any protection beyond that territory can only be achieved on this basis if parallel national design rights are obtained in several individual states, usually chosen by the degree of economic interest for product sales. On this basis, a bundle of rights can be created, covering the relevant geographic area as a whole. But in fact, such "bundled national rights" are rarely applied for in practice, considering there is a basic protection as unregistered design anyway, and there are substantial costs involved in the accumulation of national rights (filing fees, publication fees, legal fees, etc.), especially in case of design protection of non-durable consumer goods as produced by the fashion industry or toy industry, etc. Yet, even companies in branches producing longerlasting products as, e.g. in the automotive industry, electronics industry, etc. usually restrict themselves to design protection in key sales markets (Hasselblatt, 2017).

Still, a maximum of international protection is and has always been envisaged by producers, just as measures of harmonisation have been induced and partly also already achieved by the international community. These measures consist of international treaties harmonising the national application and registration process (multilateral treaties) or autonomous international regulations works establishing new, uniform design rights applicable on the territory of several nation states. An example for the latter – here for the EU legal space – is the Council Regulation (EC) No. 6/2002 of 12 December 2001 on Community Designs (Community Designs Regulation), which grants a unitary right covering all the EU Member States for up to 25 years for registered rights (as far as every fifth year the renewal fees have been paid) as well as three years for unregistered design rights.

The community design is granted additionally to national design protection, which in the European legal space has anyway to large degree already been by harmonised the respective implementations into national laws of the Directive 98/71/EC of the European Parliament and of the Council of 13 October 1998 by setting up the harmonised standards for eligibility and protection of most types of registered design.

Beyond the EU, the Hague Model Convention is today the most important providing uniform treaty registration procedures (but no direct effect, as substantial national design law remains applied) in all the Member States. This is similar to the Madrid Trade Mark Convention, which also unifies only the filing and registration Registration procedure. procedures are maintained by the WIPO Office located in Geneva.

The Hague Model Convention consists of three separately amended versions of the original Convention of 1925, being the "London Version" (2 June 1934), the "Hague Version" (November 28, 1960) and the "Geneva Version" (July 2, 1996), which are all parallel in force, as they addressed different international needs. It is thus essential to specify exactly to which version of the Hague Model Convention is referred to.

2. Design protection in user-driven innovation

From an IPR perspective, there are two types of user-driven innovation, which differ by the nature of the "innovation target", which may be either a public (i.e. freely available) good which to innovators contribute on an entirely private and voluntary base to a public good, or innovators contribute their achievements in corporate environments on behalf of the employing company, which has to re-finance these investments via licenses or selling items in which the innovation has been realised. The first model is known as "private-collective innovation" (von Hippel & Krogh, 2003) and is regularly found in the IT branch, where this way open source software is developed or maintained (see e.g. Linux); eventual arising IP rights are deliberately waived. The second, traditional model, has on the other hand to protect their innovation in form of IP rights in order not to be deprived of the profits of its investments

Anyway, also companies often waive their IPRs, as they realise more and more that making their technical state-of-the-art freely available has the potential to generate a much higher return in innovation than the private-investment model (Henkel et al., 2013), as the intrinsic motivation of the contributors for their free commitment exceeds by far employees' motivation (Alexy & Reitzig, 2013).

In spite of this, there are at present no gratification schemes, which would enhance a balance of interest between these voluntary innovators and companies "harvesting" these contribution, which – being of immaterial character – can only be corrected by adjustments in the existing intellectual property protection schemes for design among protection systems discussed above. A granted registered design is a strong and effective right, and also the unregistered design grants the creator of the design a range of rights ranging from monetary compensation for past infringements to injunctions against future infringements.

In fact, every design made available via online communities is (if the respective criteria in terms of novelty individuality are given) is at least protected as an unregistered design holder according to national law or - in the EU – according to the community design regulation. As most users making their designs available in public are not aware of this, in most cases there is little practical impact of their disclosure. But the situation changes if the private company copies that design found online and seeks protection of its legal position from the usage of that design against other third persons: In the case presented above, the furniture company may eventually intend to apply itself for design protection based on the design disclosed on the internet by the amateur carpenter. When it will hand in a respective application for a design at the competent office, in most legal systems the office will check - among other conditions – the novelty of the design. If the

company did not disclose itself the origin of the design, a research by the office may reveal the amateur carpenter as creator, who, in this case, also made his design publicly available - depriving it from its novelty. But the company's situation is even at stake if it does not apply for design protection, but simply starts mass production within three years after design disclosure, as the initial creator will in many cases be protected at least as holder of an unregistered design right. Depending on the respective legal regime (national or international law, depending on the function of the design office), the amateur carpenter could file a notice of opposition within a special opposition period, and also without such an opposition the company remains endangered that the user will later hand in an action for nullification of the design, as the conditions for its grant had not been met, or sue for cease and desist from the usage of his design in case the company did not apply for design protection, but trusted to have an unregistered design.

In other words: If a company endeavours the complete exploitation of a design – and the more attractive the design is, the more probable this endeavour will be –, it has in some way to cooperate with the creator of that design. Otherwise, it will run the constant risk of a later revocation of its design right, including a court order to cease and desist from usage of that design.

(5) Findings and Discussion

A closer look at the German statistics concerning design protection reveal that in 2017 about new 44,300 design registrations were executed, and the largest number of registrations concerned furniture (ca. 12,000), followed by clothes (ca. 10,000) and graphic design objects (ca. 7,000). All in all, the number if design registrations decreased by about 22% compared to 2016 but during the period from 2010 to 2016, the number of annual design registrations ranged around 50,000. Interesting wise, the 2016 figures reveal that the top three leading company with design registrations consisted of an Italian company (4,200 registrations), a German enterprise (2,230) and an Austrian company (1,116). At the end of 2017, altogether 312,860 design registrations were enrolled in the databases of the German Patent and Trademark Office (GPTMO, 2017).

Although a clear demand for the regulation of these forms of cooperation exists, the legal protection of user's interest in the context of user-driven innovation has not yet been settled. Still, there is a similar constellation of interests, which already has been regulated in detail by law. Just as in user-driven innovation, an employee not holding any personal shares in the profit of a company generates innovation through own design creations he or she develops through daily contact with products or their production, which usually - if they are highquality design ideas - find their way to the company's management, are respectively implemented into production, hence lead to the attraction of these products and increase the profit of the producing company.

The European Commission took from 2010 cross-cutting RRI actions and financed a couple of international research projects in order to develop a RRI governance framework. Driving force were here the EU constitutional

values comprising respect, for human dignity, liberty, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. Background idea was that innovation and new technologies should meet the global challenges by respecting the European values and safeguarding development, social cohesion and the maintenance of economic prosperity in the frame of the EU2020 Strategy (EU, 2012b, 2013d). Important key points were dedicated to open access and ethics as well as to certain extent governance, which are covering the topics of this paper. Among the initiated EU research projects on RRI, some were touching design protection and user-driven innovation including the Res-AGorA and the IRRESISIBLE projects (Res-AGorA, 2018). Both projects looked at the case studies in design and smart manufacturing sector and investigated the contextual RRI framework. Yet, the legal aspects of our research have not been discussed, especially employee's design rights were not in the centre of the research projects so that a clear and generally accepted legal framework is still missing.

In terms of law, employee's design rights generally are automatically transferred to the employer, see e.g. sec. 7 II German Design Act (DesignG), unless the design has been created explicitly beyond the creator's contractual tasks. In contrast to employee's inventions, which entitle the employee in return to a respective monetary gratification (art. 9-12 ArbNErfG), the German Design Act does not provide any regulation gratifying the employee for his or her contribution. Still, in cases of truly successful and artistic design creations, German Copyright Law grants the author in sec. 32 II 2 an equitable remuneration at an amount which "corresponds to what in business relations is customary and fair, given the nature and extent of the possibility of use granted, in particular the duration, frequency, extent and time of use, and considering all circumstances" (Schwab, 2014; Hasselblatt, 2017).

This regulation provides at least a general approach of how interests of the creator of a successful design and the employer in the situation of "employee-driven innovation" can be balanced. It may be argued that this model cannot be applied directly on the situation of user-driven innovation, as there is an essential difference. While the designing employee and his employer are bound by a joint employment contract, there is no contractual relationship between the user providing attractive design in a virtual community and the innovation-exploiting company.

But just as the gratification paid to the designing employee does not arise from contractual relationships, but simply distributes a respective share of the profit made by the company expected on base of the new design, the duty to pay a respective gratification on base of copyright law - in our example sec. 32 I UrhG, including its calculation methods - can be respectively applied to the favour of users in user-driven innovation as well, serving exclusively that balance of interest also envisaged in userdriven innovation and rendering the company's design strategy sustainable. As the user does often not know, which company may

exploit his design in future, and as there would not be any duty to inform anybody about eventual designs for users anyway, the information duties would be reversed, i.e. the interested company would be obliged to disclose its intention to make use of a specific design to its respective author (as far as possible). If the author does not react within a period of time still to be determined, his consent would be assumed, thus leaving untouched his claim for gratification, if he only finds out about the use of his design later.

(6) Conclusions

The way technical innovation is generated in companies has essentially changed in recent years, and the trend has just started. No internal design department of any company has the resources to compete with the "creativity of the crowd" provided by millions of private product users every day in real time, based in real experiences, and so far – at no costs. Thus, companies access design ideas or users provide these designs to companies so far for free, as the "Open Source Spirit", which is based on an informal understanding of mutual benefit of all actors involved, leaving any claims for monetary compensation aside, is still alive in the internet community, and as many users do not realise that their designs disclosed on the web have indeed an eventually considerably high market value at all.

The European Union has recognised the importance of these issues and initiated activities to develop a RRI governance framework addressing socially responsible innovation. It describes a research and innovation process that takes into account

and effects potential impacts on the environment and society. These cover important basic points dedicated to open access, ethics and governance, which are covering the protection of design rights in open access environments. Some initiated EU research projects on RRI were touching design protection and user-driven innovation but a clear legal framework was still missing.

The estimation of the benefits of user innovation communities for companies is manifold, comprising sustainability aspects due to stronger user orientation in product development as well as significant cost aspects due to their analysis of all success dimensions. All phases of the life-cycle supply chain of a product are also covered. Consequently, large potentials in the usage of design innovations from user communities have to be kept in mind when it comes to the evaluation of related tentative IPR payments to users.

While the exploitation of this design knowledge is at present basically free for private companies and therefore is becoming more and more essential in the firms' scheme, the "Open Source Spirit" will sooner or later fade: This is because users will realise that there is not much of a mutual benefit left if their creative contributions that do not serve a public good but rather the profit of private companies. This does not mean that the trend to even more user-driven innovation should be stopped or even reverted. On the opposite, the abundant resource of user's creativity should even be explored further, and much more, the communication between users and private companies should further intensify.

Hence, a legal framework for these

considerable transfers of value is required, providing sustainability and a minimum of balance of interests of both users and companies. Legal practitioners should themselves with user-driven familiarise innovation business models and implemented technologies. Such a framework is so far lacking in most legal virtual systems, as the dogmatically closest legal mechanism employee's invention law and copyright law – cannot be directly applied on user-driven innovation. This is due to the lack of any legal relationship existing between the innovating user and the exploiting company. There is still one element in employee's copyright law, which is not based on a contract between both parties – a duty to pay a respective gratification to the private designer. This duty should be imposed on companies exploiting user-driven innovation, respectively - at least as far they want exclusively exploit the innovation on base of the existing design.

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