

**Recognition of Value: A Critical Step in the Value Creation Process**

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**Abstract**

*This paper has demonstrated that the intentional Value Creation process presented by can be enhanced by adding connections between the Value Creation Process of and the Creativity Process of within a corporation, and that those two internal processes also have a relationship with the external entrepreneurial processes modeled by Krueger-Brazeal and Furthermore, all of these constructs can be related to the massive amount of dormant technology available in corporations, R&D labs, government research centers, universities, and foundations/nonprofit research centers. The relationship between each model assist in capturing the essence of Shane and whose article laid out a design for Entrepreneurship as a unique field of research. When the aforementioned models are included in one holistic model, the internal and external entrepreneurial processes are shown to have the same or nearly identical features.*

**Keywords:** Internal Entrepreneurial Processes, External Entrepreneurial Processes, Dormant Technologies, Recognition Of Value, Value Creation, Value Capture

**Introduction**

The value creation process has been examined by numerous authors from Schumpeter [1], his theory of “creative destruction” was prescient that we create new ventures to replace (or replace and destroy) older ones. Kirzner [2] created a place for entrepreneurship within microeconomic theory; Drucker [3] connects innovation to entrepreneurship, and then Shane and Venkataraman [4] establishes the recipe for entrepreneurship to be a fruitful research field. These were the impactful research articles in a wave that included Amit, Gloston & Mueller [5], Amit, Mueller, and Cockburn [6], Baumol [7], Casson [8], Cohen and Levin [9], Hayek [10], Kirzner [11], Low and MacMillan [12], These are just the highlights of the past 90 years of research. The purpose of this research is to establish the linkages between several points of view on creativity, entrepreneurship, value creation and opportunity recognition. Recently, Davidson [13] urged a redefinition of some concepts and created an environment of External Enablers impacting Actors and New Venture Ideas. While theses a very helpful constructs, they only really apply to a segment of the market for opportunities. The concepts presented do not represent the process for the “accidental discovery” which is not a “New Venture Idea” being pursued by an “Actor” which benefits from an “External Enabler.” An “Accidental Discovery” is more like a “blind date.” Post-It Notes is a great example of this, or Slinky. In both cases, there was no intent to find or create a new idea, yet it happened in both cases. The Slinky has had a long career in the

market. It is a very successful toy. Or perhaps we can extend this same notion to serendipitous meetings, when researchers a trying to solve one problem and end discovering the solution to a totally different problem: viagra or Lexan. Viagra was being designed as a blood pressure drug. It certainly gave blood pressure to men in a special place, but not for the purpose originally intended. Lexan was a discovery that was many times harder than intended. It was used for football helmets because you could hit it with a hammer and not dent or crack it. These discoveries do not fit the linear process outlines by Davidson. The Davidson [13] process definitions also do not fit for the ultimate use of “dormant technologies” or new uses for “old technologies/services.” These two case histories would apply to the fax machine which was developed for the Navy in preparation for World War II, but was not commercially produced for business applications until the early 1970s. Another similar example would be the overnight delivery service developed by Federal Express. The use of airplanes for delivering mail was available for a few decades until FedEx said, “When it absolutely, positively has to be there!” Everyone had the tools (planes, trucks, and warehouses), but they needed to engage a heuristic to schedule the planes and the distribution in coordination with ground transport. The USPS and UPS essentially had the heuristic for airmail and delivering packages in 2 days. So, again this does not represent the largely linear process imagined by Davidson [13].

In order to be as inclusive as possible of entrepreneurial opportuni-

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ties and the environments in which they are created below is a list, which may not be comprehensive, but is more inclusive than most research efforts on entrepreneurship. This research is intended to provide a framework for entrepreneurship which is as inclusive of entrepreneurial modalities as possible. Therefore, here are types of entrepreneurial opportunities and the environments in which they are created:

1. A firm encourages new ideas and identification of new opportunities [8, 14, 15]
2. A firm that has “next square” or “adjacent square” opportunities e.g. , same technology or modified technology, adjacent marketplace [7, 16]
3. Dormant technologies [17-20]
  - a. taken out by a competitor’s acquisition;
  - b. technology lacking a breakthrough;
  - c. technology too expensive or too exhausting to develop;
  - d. technology that does not have a viable marketplace;
  - e. technology that would cannibalize the market of an existing product;
  - f. technology from another marketplace that is adapted to solve a market need in another market; RFID for inventory, and RFID for medical devices
  - g. technology from a non-commercial marketplace that is adapted to solve a commercial market need in another market; EZ Pass, fax
  - h. technology that gets leapfrogged
  - i. technology that gets beaten to market
  - j. technology that the developers cannot agree how to achieve a breakthrough so they abandon it.

**An inventor who devises a new technology for which there is an identified market [21,22]**

4. An inventor who devises a new technology for which there is no identified Market [17, 23]
  6. Investor(s) who support inventors #4 and #5 above [3, 24, 25]
  7. Inventor(s) who spin off a new venture from an existing firm [14]
  8. New technologies developed by an R&D department of a corporation [26, 27]
  9. New technologies developed in response to requests from external organizations or individuals [10, 28, 29]
  10. Accidental discoveries-trying to solve one problem (market need) and accidentally discover the solution to another problem or market need; e.g., slinky, viagra, lexan [30, 31, 32]
  11. Creation of market disruptors: cell phones vs. beepers; Fed Ex vs UPS; electric cars vs. gasoline driven cars; hyper loops.... [1, 2, 33, 34]
  12. Why, when and how opportunities for the creation of goods and services come into Existence [1-3, 35, 36]
  13. Why when and how some people and not others discover and exploit these Opportunities [2, 35, 37-40]
  14. Why when and how different modes of action are used to exploit entrepreneurial Opportunities [9, 13, 41]
- Drucker [3] describes three additional categories of opportunities:
- 15) creation of new information which occurs when new technologies are invented [42]. exploitation of market inefficiencies that

result in information asymmetry as across time and/or geography [43]. the reaction to shifts in relative costs and benefits for resources, i.e. political, regulatory, demographic [44-46].

The recognition of value, value creation, and value capture processes can be modeled by combining the models of Amabile, Conti, Coon, Lazenby, and Herron, [47-48]. and model the origin of the opportunity (internal or external), some sources of the opportunities, and provide a construct for looking at dormant technologies and how they can be energized and reenter the whole schematic. Dormant technologies represent 75% to 95% of existing patents, as well as ideas, concepts, opportunities for which no current patent exists. In the schematic for the integrated model, a dormant technology can be inserted almost anywhere and proceed through the process until value capture is achieved. Dormant technologies may have more potential value, a quicker value creation process, and a significant value capture result, especially if it was taken off the market because a competitor wanted to eliminate competition from a potentially superior technology, and buys the company or the technology from the competitor. It may be that the existing technology can still be leapfrogged. Sometimes a superior technology doesn’t survive a regulatory battle.

For example, in the 70s and early 80s there was a battle over video tape standard technology with VHS and Betamax were the contenders. Betamax was considered by most experts to be the superior technology, yet it lost the market regulatory battle to VHS likely due to its higher cost, as well as the market penetration that VHS had achieved up until the time the regulatory standard was set by the industry. Technologies can be transformed in some cases for another purpose. The video tape wars ended in the defeat of the Betamax technology. Since that time several technologies have upgraded what is now the video disc sector of the industry.

Lepak, Smith and Taylor [47]. was both timely and crucial as firms struggle with improving their execution of strategy in faster and more efficient ways so that the value that is created is realized by their stakeholders in the products, services, processes, and financial market performance delivered by the firm. They provided an excellent overview for an intentional process of capturing value from providing new products, new services or new processes to a stakeholder group and recognizing how the value can be transferred or improved upon as an innovation moves through the steps in the process. They recognized that value creation has been addressed in the strategic management [49, 50]. and human resource management (Simon and March,) literatures, and from the perspectives of customers and other stakeholders [51-53]. The model that they presented starts with the Source of Value Creation (from an academic discipline perspective), then moves to the intended Target or User of the Value, the Value Creation process itself, and then to Value Capture. In the Lepak, Smith and Taylor model, the Source of Value is the prospect, or the starting point, of the value creation process itself.

The innovation may start with an idea from an individual, or an

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identified customer need, or it may have been part of organizational initiatives. The innovation process may have sociological underpinnings, or economic, psychological, and strategic sources. The User or Beneficiary of the Value may be individuals, customers, government, or society. The Creation Process may have numerous dimensions and may be a product, service, or process. Value Capture also may take many forms (technology, products, or services sold and/or licensed, or occur in numerous markets (financial, wholesale, retail, human resource, natural resource, etc.), or alter value creation processes themselves, etc. However, there is an additional step in the process that involves “Recognition of Value.” (See Figure 1 Below). Before determining how to “capture value,” there must be recognition of the value and market potential of a product or service.

This *recognition of value or opportunity recognition* needs to occur before performing the analysis to determine what that market value may be and how to capture that value. Opportunity Recognition has been cited as a key step in entrepreneurship process [54-56]. Opportunity recognition is just as important internally in a corporation as it is externally for the self-employed entrepreneur. In the corporation, sometimes technology gets developed and the market opportunity is not recognized, and the technology is abandoned or put on hold [57]. (e.g., the fax machine was developed by the Navy for World War II). Sometimes when a technology or product is being developed an application is discovered that may be more valuable than the original project and the firm redirects its resources to that new innovation (e.g., Pyrex cooking bowls, dishes and plates were a valuable alternative for Corning and not the original purpose for the project). In some cases, an application alternative is not recognized, and the technology or product lies dormant for many years. Many dormant technologies get sold, transferred or donated to other organizations [58-60]. who go through the “recognition of value” phase as well. Also, a technology or product can be developed accidentally during the development of another product or technology [30, 32]. Examples of accidental discoveries are numerous, e.g., Silly Putty (GE), Viagra (Pfizer), Lexan (GE), or Post-It Notes (3M). Finally, sometimes the entire organization does not recognize the value or the opportunity even in an intentional creativity/innovation process such as occurred at Xerox PARC. This is essentially what happened with Xerox who had developed the personal computer, GUI computer interfaces, LAN technology and WAN technology [61]. Xerox did not recognize the market potential of the technologies that they had developed, and they essentially undervalued the GUI interface technology adapted by Steve Jobs and Gary Wozniak in developing the Apple personal computer. It had value but if the value was recognized by Xerox, there was not sufficient interest to either recognize the full value of the technologies through a licensing or sale of the technology, or through capturing their value internally by manufacturing the components or the software. Another example is the relatively low price that Bill Gates paid for QDOS (reportedly \$50,000) to provide the MS-DOS operating system for the IBM personal computer [62].

The modified model includes Recognition of Value (Figure 1) that comes as a natural bridge in the intentional value creation process when the firm recognizes the market value potential of a product or service that they have been developing and decide to push forward with the product or service introduction. The firm must recognize or determine the value before proceeding with Value Capture or taking some other path. The firm could sell or license the technology or product to another firm, or enter into a joint venture to design, manufacture and distribute the product. Each of these tactics could be part of the Value Capture step in this process. But the company can suspend the process because the business case doesn't close if the cost of manufacture is too high, the product or service really doesn't fit the strategy or the firm's core competencies, or a competitor has come up with a better alternative in the interim. There also is the possibility that the firm does not recognize, or undervalues, the market value potential of the product or service. In this case, the firm could try to capture some value by selling or licensing the technology. However, not all innovations move smoothly through the process. Some innovations get abandoned at the value capture point or earlier. Also, sometimes ancillary applications become possible but are not recognized as having value and the technology, product or service lies dormant or sufficiently underutilized to represent uncaptured value. Additionally, sometimes the market conditions change from the time the original concept is brought forward to the time the value capture decision is imminent. In this case the project may have value, but the timing is not right to develop it. Also, sometimes technologies, products or services are developed for one purpose and they get used for that purpose (e.g., viagra), but the largest value opportunity goes unrecognized or it takes several years to convert the technology to a viable commercial application. For example, defense technologies have long been converted to non-military applications and this too may be part of an intentional process. Defense and aerospace contractors often look for commercial applications for the technologies that they develop, and we get products like Tang or technology services like EZ Pass. Sometimes the market potential lies dormant for many years. Sometimes the technology is available, but no one recognizes an obvious application. And so, Fred Smith develops a concept to deliver packages overnight in the face a competition from the US Post Office and UPS who had huge market shares and the technology to provide the service, but they didn't have the logistics model to provide the service. So “when it absolutely, positively has to be there” you can use Federal Express.

If the opportunity is recognized, what happens next? We can appeal to the research by Amabile, Conti, Coon, Lazenby & Herron on the creativity environment within the organization. As depicted in Figure 4, they have provided empirical evidence that there are three dimensions that fosters creativity in the work environment (Encouragement of Creativity, Autonomy or Freedom, and Resources) and there are two dimensions that may have non-positive impact on Creativity in the work environment (Pressures, and Organizational Impediments to Creativity). Their results provided seven (7) factor loadings and each factor was significant in explaining the level of Creativity in the organization.

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The Encouragement of Creativity has two factors: Organizational Encouragement and Supervisory Encouragement. The organization can encourage creativity by giving any number of rewards from bonuses, salary increases, promotions, compensation time, lab space, budget resources, equipment, etc. to employees who have ideas, introduce new products as part of their work assignments, complete projects after hours, etc. A supervisor may give additional encouragement by giving additional departmental resources in all of the aforementioned categories and by recommending creative employees for promotions and new assignments. If an individual inside a large organization has an idea for a new product or recognized an opportunity, they could go through the stages of the Amabile et al model. Is the opportunity an offshoot of something in progress; a new idea based on the individual's knowledge and exposure to new technologies; an opportunity to improve a process, service, or product discovered during a Six Sigma project; an accidental discovery; or does it have some other origin? The individual could consider whether their supervisor would support them in developing the new product (supervisor encouragement), whether their team colleagues or peers would approve of their involvement, and what types of rewards that they may garner for successfully completing their project (organizational encouragement). In addition, they could consider whether they would have freedom to conduct their technology development or whether their project would be placed under someone else's authority. So the Autonomy or Freedom factor is very important. Finally, would the resources (financial and time) be appropriated to the recognized opportunity?

In addition to this internal assessment, the employee may consider developing the opportunity outside the firm. The individual may develop the opportunity on his/her own, start their own business, form an alliance with friends or co-workers, or take the idea to an entrepreneur. Therefore, the individual is considering becoming an entrepreneur. Kreuger and Brazeal developed a model of entrepreneurial potential as shown in Figure 3. A potential entrepreneur can assess an opportunity and consider whether the opportunity has Perceived Desirability (based on social norms would the opportunity be perceived positively) and Perceived Feasibility (based on skills and competencies possessed would this be possible to do). How much Credibility would the opportunity have in the marketplace and how much credibility do I have as an entrepreneur pursuing this opportunity? What is the market Potential of this opportunity and my potential to carry it through to completion? Then what are my Intentions to become an entrepreneur? Once an entrepreneur decides to move forward, the Opportunity Recognition would lead to the development of a Business Plan, determination of a Production process, and then result in the providing a Product or Service to the marketplace. When we look at Bhave's model [21] (Figure 2 below), opportunity recognition precedes development of the Business Concept or Business Plan for the entrepreneur which is followed by the setting up of the Production Technology or Process and then completion of the Product or Service for sale to the customer. The Product or Service delivered to the marketplace then enables the Value Creation Process. We can con-

nect Figure 2 to Figure 1. Therefore, the Krueger-Brazeal process conceptually precedes the Bhave process [21], and each can relate or connect to the Lezak, process.

Also, in connecting to Krueger-Brazeal's model, internal employees would consider the Perception of the Desirability, Feasibility, and Credibility of the product. For example, products may have more prestige than services in the work environment according to the organization's norms. As a result, products may have a higher level of feasibility in an organization than services. Products that serve certain industries also may get more workgroup support and ancillary resources, as well as prestige. Therefore, the Credibility of the project may influence the internal entrepreneur in deciding to accept responsibility for the product development. All of these factors can be influenced significantly by Organizational Encouragement. For example, rewards may be higher for services because they have higher margins. Stated goals for organizational creativity by classification, industry, products, processes, and services, etc. can assist in expanding organizational encouragements. The amount of budgetary support (Resources) and the milestones for project completion may influence an internal entrepreneur. The greater the budget freedom and project control, the more likely an internal entrepreneur will pursue their creative ideas. Otherwise they may enter their idea into the suggestion box and not want to be involved, or worse yet, they may not share their ideas.

The aforementioned series of questions naturally places the individual or group that recognizes the value at the intersection of the Amabile [14], and Bhave [21] models. If we characterize the Lezak, Taylor, Smith model as an intentional value creation process, their model has a natural linkage with the Amabile et al model that depicts the creativity environment in organizations with the intent to encourage creativity and create more value. These same models can be used to model the unintentional entrepreneurial process and the decision process confronted by any individual who recognizes an opportunity within an organization. Since an individual or group recognizes an opportunity and its potential value may choose to take the initiative outside the organization, there is a connection of the intentional internal process to the external entrepreneurial process so well examined by Krueger-Brazeal and Bhave [21].

The individual or group may choose to totally evaluate the Opportunity Recognition using both the Amabile et al and Krueger-Brazeal models before deciding how to proceed. Additionally, if the individual is part of an internal group which is making the evaluation, then that individual may be impacted by their social location in the process [63]. That is, was the individual responsible for the Recognition of Value? Was the Recognition of Value identified by one individual and then refined by into a "viable opportunity" after discussion, brainstorming, and refinement by the group? Does the group have the financing collectively or from a member to start the "Value capture" process as entrepreneurs and then proceed according to the Bhave [21] model? Does the individual possess unique skills necessary to the success of the venture as an external process?

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After performing the assessments modeled by Amabile et al and Krueger-Brazael , the individual can make one of five decisions: 1) decide to bring the Opportunity Recognition forward internally with the intent to be the leader or champion; 2) decide to bring the Opportunity Recognition forward internally to the appropriate person, department or entity (e.g., supervisor, department, or R&D organization); 3) decide to take the opportunity outside the organization as i) an individual proprietary project, ii) as part of a proprietary group, iii) as a new organization (individual or group), iv) a venture with an entrepreneur; 4) decide to postpone bringing the Opportunity Recognition forward either internally or externally because the timing is not right; 5) decide not to bring the Opportunity Recognition forward either internally or externally at the present time because of results in the assessments. Decision #5 implies that the individual or group performs an assessment using both models and finds insufficient evidence to proceed with the Opportunity either internally or externally. Decision #4 implies that one or both models encourage moving forward on the opportunity, but that there are one or more conditions that are not conducive to success at the time considered and that the condition (s) may change in the future. For example, perhaps the departmental budget is anticipated to increase next year which will provide the resources to pursue the opportunity or perhaps the economy is in recession and the opportunity would not be well received or likely to succeed until the economy is stronger.

Decision #3 implies that the individual or group is not obligated to receive permission to take the Opportunity Recognition outside the organization or to turn any ideas over to the firm. Also, the evaluation using the two models places higher value on external development than internal. This may be from a personal perspective (or for the group) or it could result from an assessment that the firm would not proceed with the development of the concept. Therefore, there is greater overall, as well as individual, value from taking the opportunity outside the organization. In some cases, the individual (or group) has planned on an entrepreneurial venture, but he/she was waiting for the “right” opportunity. Decision #2 implies that the individual wants to contribute to the organization by sharing their Opportunity Recognition with the organization for the Value Capture phase. Decision #1 implies that the individual wants to bring the idea to fruition as the leader or champion within the organization. Some firms reward employees by giving them the leadership opportunity for ideas that they provide the organization e.g., 3M with Genesis [31].

The decision to pursue an Opportunity internally may be influenced by work environment pressures as depicted in the factors of Challenging Work and Workload Pressures. To the extent that the organization encourages creativity that is manifest in Challenging Work assignments, then a creative employee may feel encouraged to accept additional challenges. Also, the level of Workload Pressures for error free results, on-time performance and delivery, realistic tollgates in the creative process, etc. all may influence the creative employee. If there is little slack in the schedule or tolerance for missed deadlines, then it may discourage the acceptance

of new creative assignments even if those new assignments are determined by the individual themselves.

Finally, if the organization has less onerous bureaucratic requirements, has shorter time frames for decision-making and approval of proposals, doesn't have a history of under funding projects, has a history of rewarding creativity, etc., then the balance of organizational encouragements versus organizational impediments may tip in favor of encouragement. The internal entrepreneur will perform a set of process checks that are similar to the independent entrepreneur. Once the internal entrepreneur has decided to pursue the creative process, the goal will be to produce a new product, process, or service that will satisfy the needs of a specific user group (individual, firm, government), require a process for bringing the resultant product, process, or service to market, require a determination of the market opportunity (Opportunity Recognition), the development of a Business Plan, Production Process, then the sale of the product, process, or service [21], to market participants (Value Capture Process).

The independent entrepreneur also will check to see what encouragement he/she has to enter the market, what resources are needed to develop the product or service and whether a creativity process is needed, what financial resources are needed, etc. This leads to Opportunity Recognition, the Development of Business Plan, introduction of a Production/Technology Process to produce the product or service, and sales of the Product or Service to the Customer (also Value Capture). The research on the independent entrepreneur has shown that there are two basic tracks of exploration based on the Opportunity Recognition trigger [26]. That is, if the entrepreneur generates the creative concept, then he/she will evaluate the opportunity and then check the extent of the creative process (e.g., lab research) needed including expertise required to complete the process, financial, production, marketing and other resources needed, support needed from ancillary resources (e.g., business incubator, SBA, resources on how to start a business, etc.), from there the business plan is prepared and when the prototype is available, a production plan is executed that will result in the product or service being available for sale to the ultimate consumer. If the entrepreneur is considering one or more opportunities created by others, then they will follow the same steps detailed above, but they may place greater emphasis on securing the appropriate technical expertise to execute the business plan.

It should also be noted that an individual or group external to the organization may bring an external Opportunity inside a corporation to proceed with the Creation Process and/or Value Capture. This may be an external organization that has been in existence for several years that has developed an Opportunity to the point where it is ready for the Value Capture stage or when it is early in the Value Capture process. Many entrepreneurs desire this outcome over going further and pursuing an Initial Public Offering (IPO) of common stock. Alternatively, the entrepreneur may recognize that the costs of developing the technology may exceed their resources or outstrip their ability and desire to pursue the Opportunity in-

dependently. They bring the concept to a corporation and hope to remain the leader of the project, but they likely will perform due diligence and use a checklist like that provided by the Amabile et al model before finalizing the sale of the Opportunity. Or they want to sell the Opportunity and reap the benefits of their invention and let the corporation execute the remainder of the Creation Process and/or Value Capture Process.

The acquisition of firms and/or intellectual property may stifle competition or be defensive maneuvers to protect a competitive advantage. These issues are subjects considered by lawmakers, regulators, and policy makers [33]. These strategies may explain the significant number of dormant patents and technologies [64, 65]. There is now a major international effort to stimulate the sale or donation of dormant technologies and to create markets for resale or licensing [66-72].

Consequently, we can make the connection between the Entrepreneurship Models, the Creativity Models and the Value Creation Process as shown in Figure 5. The processes are connected, and the lineage may occur, at more than one junction depending on when Opportunity Recognition occurs and the direction of association is influenced by whether the entrepreneur is inside (internal entrepreneur) or outside (independent entrepreneur) the corporation. In the case of an independent entrepreneur the steps in the process and the connections also are influenced by whether the opportunity is generated by the individual himself/herself or is externally provided from another source.

### Summary

This paper has demonstrated that there are connections between the Value Creation Process and the Creativity Process within a corporation, and that those two internal processes also have a relationship with the external entrepreneurial processes modeled by and Bhava [21]. When included in one holistic model, the internal and external entrepreneurial processes are shown to have the same or nearly identical features and that it is possible to connect those models to the marketplace for intellectual property and the laws, regulations and policies that govern market behavior.

Once the integrated model is demonstrated, then there is a place for Dormant Technologies to be entered into the internal or external processes shown in Figure 5 depending, in part, on the reason the technology was dormant. Perhaps the technology had a good basic foundation and an intrapreneur or an entrepreneur (individual or organization) sees the opportunity to add artificial intelligence technology to create an application for an early warning system to avoid car crashes in automobiles. Once entered into the process as depicted in Figure 5, the steps can be completed until value capture is achieved.

With so much dormant technology represented by dormant patents (75% to 95%), there is a need to further explore how dormant technologies enter into value creation and value capture processes.

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